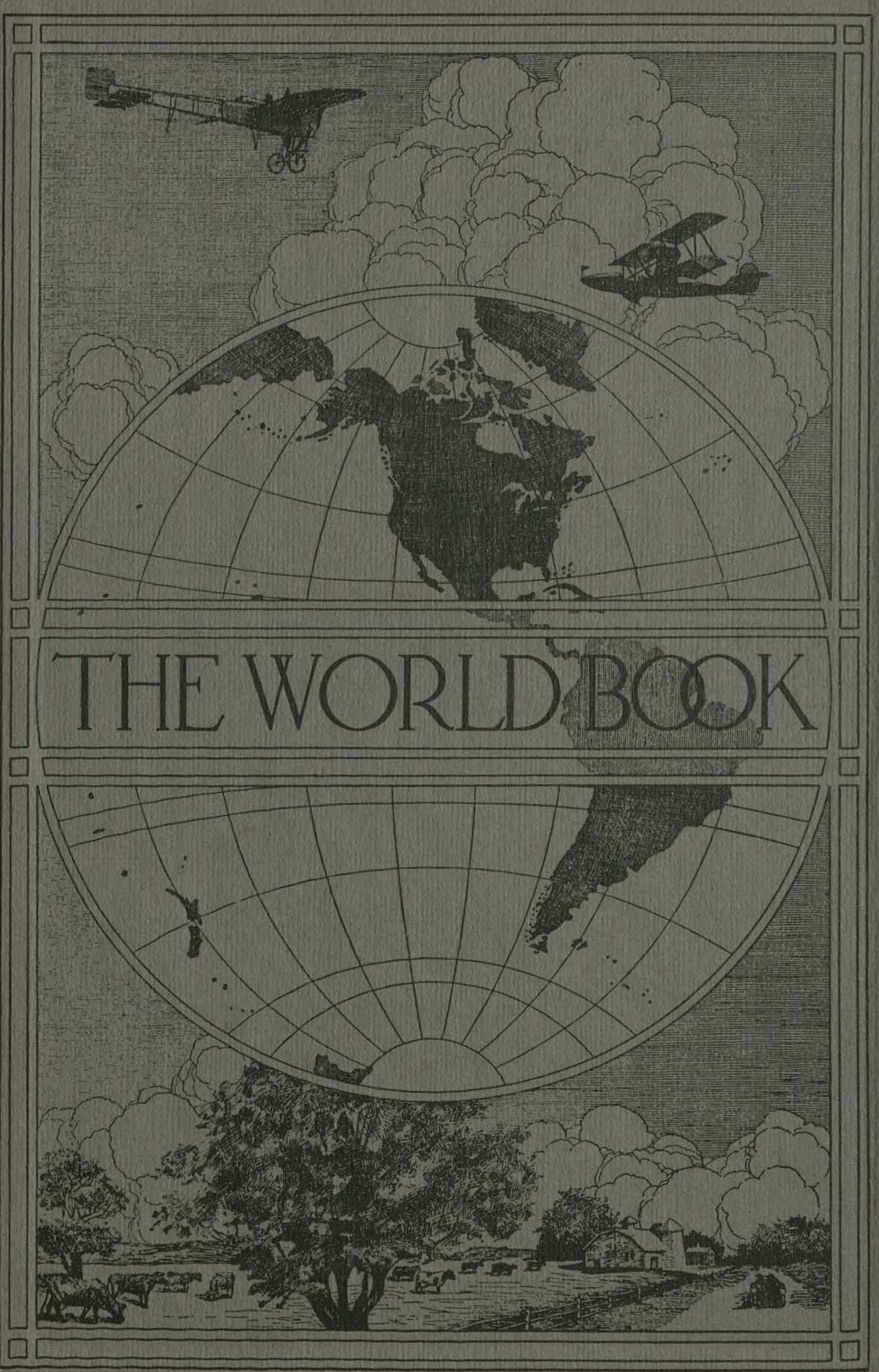
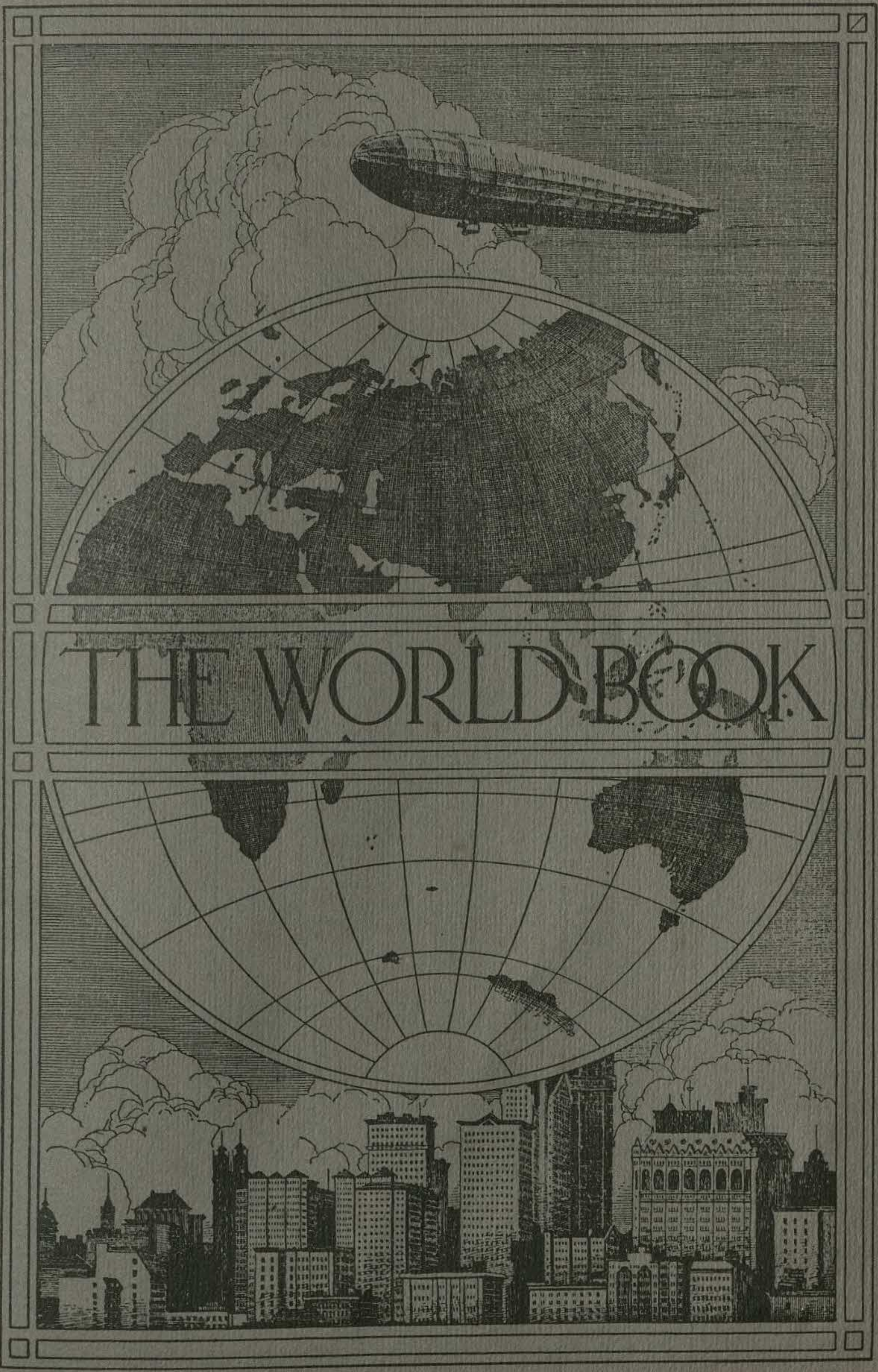
THE WORLD BOOK


THE WORLD BOOK

THE WORLD BOOK



49/20

U-V Volume 20

The World Book Encyclopedia

Library
B. C. Road

World Book International
World Book Inc.
A Scott Fetzer company
London Sydney Tunbridge Wells Chicago

The World Book Encyclopedia
(International)

© 1996, 1995, 1994, 1993, 1992, World Book, Inc. All rights reserved. This volume may not be reproduced in whole or in part in any form without prior written permission from the publisher.

22.6.2010
14031

"World Book" Reg. U.S. Pat. & T.M. Off. Marca Registrada

ISBN 0-7166-6696-0

Library of Congress Catalog Card Number 95-61137

Printed in the United States of America

1 2 3 4 5 99 98 97 96

Uu

U is the 21st letter of the English alphabet. It came from a letter which the Semitic peoples of Syria and Palestine called *waw*. *Waw* was also the source of the letters *F, V, W,* and *Y*. The word *waw* meant hook, and was represented by a symbol of a tenthook. The symbol was probably borrowed from an Egyptian hieroglyphic, or picture symbol. The Greeks borrowed the letter from the Phoenicians and gave it a *Y*-shape. The Romans, when they adopted the letter, dropped its bottom stroke and wrote it as *V*. They used it for the vowel sound, *U*, and the consonant sound, *V*. About A.D. 900, people began to write *U* in the middle of a word and *V* at the beginning. During the Renaissance, it became customary among the people to use *u* as a vowel and *v* as a consonant. See **Alphabet.**

Uses. *U* or *u* is about the 12th most frequently used letter in books, newspapers, and other printed material in English. As an abbreviation on report cards, *u* means *unsatisfactory*. In geographic names, it may mean *united, union,* or *upper*. It often stands for *university*. In chemistry, *U* is the symbol for the element *uranium*.

Pronunciation. *U* is a vowel, and has many sounds in English. The sound we associate with its name, *you,* is really a diphthong. It is made by pronouncing two separate sounds continuously. The first sound is a *y*. The second sound is made by rounding the lips, with the tip of the tongue below the lower teeth, and raising the back of the tongue. The *you* sound is the one in *feud* and *refuse*. Other sounds of *u* are those in *sun, lunatic, bull,* and *fur*. A silent *u* may occur after *g*, as in *guard*.

Development of the letter U

The ancient Egyptians used this symbol of a supporting pole about 3000 B.C. The Semites adapted the symbol and named it *waw,* their word for *hook.*

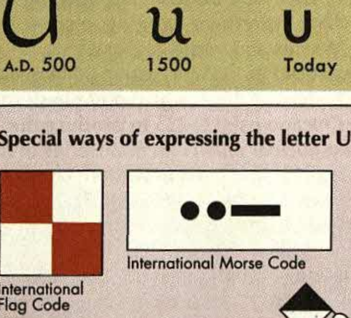
The Phoenicians, about 1000 B.C., made a letter like a hook.

The Greeks added the letter *upsilon* to their alphabet about 600 B.C.

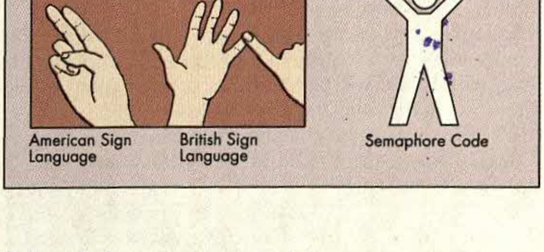
The Romans, about A.D. 114, used the letter V for both U and V sounds.

Medieval scholars began writing U for a vowel and V for a consonant.

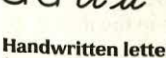
The small letter u was used in spelling some words as early as the A.D. 500's. It did not come into regular use as a vowel until the 1500's.



Special ways of expressing the letter U



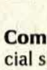
Common forms of the letter U



Handwritten letters vary from person to person. *Manuscript* (printed) letters, *left,* have simple curves and straight lines. Cursive letters, *right,* have flowing lines.

Roman letters have small finishing strokes called *serifs* that extend from the main strokes. The type face shown above is Baskerville. The italic form appears on the right.

Sans-serif letters are also called *gothic letters.* They have no serifs. The type face shown above is called Futura. The italic form of Futura appears on the right.



Computer letters have special shapes. Computers can "read" these letters either optically or by means of the magnetic ink with which the letters may be printed.

U-boat. See **Submarine** (World Wars I and II); **World War II** (The Battle of the Atlantic).

U Thant. See **Thant, U.**

U-235 is a radioactive isotope of uranium that is used in nuclear reactors and certain nuclear weapons. The value 235 is the isotope's *mass number,* which indicates the total number of neutrons and protons in the nucleus of the atom. U-235 occurs naturally in such minerals as carnotite and pitchblende. It is always combined with two other uranium isotopes, U-234 and U-238.

The nucleus of U-235 *decays* (breaks apart) by giving off high-energy radiation in the form of *alpha particles.* U-235 emits these particles for a long period of time. It has a *half-life* of about 700 million years (see **Radioactivity** [Half-life]).

U-235 is used as a nuclear fuel because it readily undergoes *fission* when struck by a neutron. Fission is a nuclear reaction in which a nucleus splits into two smaller nuclei of nearly equal size and energy is released. Before U-235 can be used in reactors and atomic bombs, it must be separated from the more abundant U-238, which does not readily undergo fission. This separation produces *enriched uranium,* which contains a higher percentage of U-235 than natural uranium does. U-235 makes up less than 1 per cent of natural uranium but about 3 per cent of the enriched uranium used in most reactors. See **Uranium** (Separating uranium isotopes).

The fissioning of U-235 produces hundreds of other radioactive isotopes. Many of them, such as caesium 137 and strontium 90, are very hazardous. Large amounts of these fission products are generated during nuclear power production. Their safe disposal has become a serious problem, which experts are working to solve (see **Nuclear energy** [Wastes and waste disposal]).

U-235 was discovered in 1935 by Arthur J. Dempster, a Canadian-born physicist. In 1942, a group of physicists at the University of Chicago used U-235 to produce the first self-sustaining *nuclear chain reaction* (series of fissions). The first atomic bomb used in warfare contained U-235. This bomb was dropped by the United States armed forces on Hiroshima, Japan, in 1945, and helped bring an end to World War II.

U-238. See **Nuclear energy** (Nuclear fission; Experimental breeder reactors); **Uranium** (Uranium isotopes).

U-239. See **Uranium** (Radioactivity and fissionability).

U.A.R. See **United Arab Republic.**

Ubangi is a nickname given to women members of the Sara, a black African tribe living near the Ubangi River in the Central African Republic. Many of the women wear flat wooden discs in their pierced lips.

Ubangi River is the chief northern tributary of the Congo River in Africa. With its main headstream, the Mbomu, the Ubangi—also spelled Oubangui—is about 2,250 kilometres long. It is formed by the union of the Mbomu and Uele rivers, and empties into the Congo near Lake Tumba in Zaire.

For about 1,100 kilometres, the Ubangi forms the boundary line separating Zaire from Congo on the west, and Central African Republic on the northwest. It is navigable all the year round below Bangui, Central African Republic.

Uccello, Paolo (1397-1475), was an Italian Renaissance painter. Uccello painted decorative works that emphasize patterns of colour and simplified forms. His paintings also show his fascination with perspective.

Uccello's best-known works are three scenes called *The Battle of San Romano* (about 1456-1460). Despite the violence of the subject, the paintings have an ornamental, theatrical appearance. A detail of one of the paintings is reproduced in **Painting** (Florentine masters). Uccello's other significant works include several *frescoes* (paintings on wet plaster). Among his important frescoes are the portrait *Sir John Hawkwood* (1436) and the Biblical scenes *The Sacrifice of Noah, The Drunkenness of Noah,* and *The Flood* (all 1447-1448).

Uccello was born in Florence. His given and family name was Paolo di Dono, but he was nicknamed Uccello. He was fond of birds, and Uccello is an Italian word meaning *bird.* During the late 1420's, Uccello worked on the mosaics in the Basilica of Saint Mark in Venice. Two frescoes dating from about 1431 are thought to be his earliest surviving works.

Uffizi Palace, a famous building in Florence, Italy, contains one of the world's finest art collections. The collection includes drawings, paintings, prints, and sculptures by many European masters. The palace itself is an outstanding example of the Italian mannerist style of architecture. It was designed by the Italian architect Giorgio Vasari in 1559. Originally intended to house government offices, it was converted into an art gallery in about 1575. The palace became a public museum in the 1800's. In 1993, a terrorist bomb caused extensive damage to the palace.

UFO. See **Unidentified flying object.**

Uganda is a thickly populated country in east-central Africa. The Africans in Uganda belong to several ethnic groups. English is Uganda's official language, but the people speak many African languages.

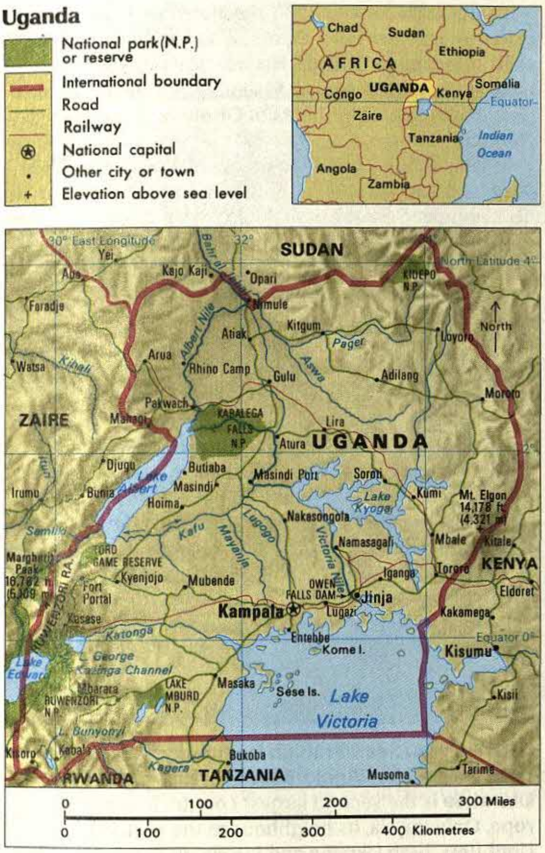
Uganda has magnificent scenery, including snow-capped mountains, thick tropical forests, and semidesert areas. Lakes cover more than a sixth of Uganda. Part of Lake Victoria, the world's second largest freshwater lake, lies in the country.

For almost 70 years, the United Kingdom (UK) governed the territory as the *Uganda Protectorate.* Uganda won independence in 1962. Kampala is its capital and largest city.

Government. A president heads the government of Uganda. The president appoints a Cabinet of about 30 ministers who carry out the operations of the government. A National Resistance Council serves as the national legislature. Most of the council's 25 members are elected. Other members are appointed by the president.

People. Most Ugandans are black Africans. Nearly all of the more than 20 ethnic groups have their own language. Uganda has no language that is understood by everyone. The Ganda, also called the Baganda, are the largest and wealthiest group. They live in central and southern Uganda. Their political and social organization is one of the most highly developed in central Africa. Until 1967, the Ganda had their own *kabaka* (king) and *lukiko* (parliament). A new kabaka came to the throne in 1993, but in a purely ceremonial role.

Most Ganda are farmers. Women do much of the work on the farms. The Ganda live in houses that have corrugated iron roofs and walls of cement, cinder block, or mud.



Facts in brief about Uganda

Capital: Kampala.
Official language: English.
Area: 235,880 km².
Population: *Estimated 1996 population*—19,278,000; density, 82 people per km²; distribution, 89 per cent rural, 11 per cent urban. *1991 census*—16,671,705. *Estimated 2001 population*—25,056,000.
Chief products: *Agriculture*—bananas, cassava, coffee, cotton, maize, sweet potatoes, tea. *Mining*—copper.
National anthem: "Uganda."
Flag: A white-crested crane is centred on horizontal stripes of black (for Africa), yellow (sunshine), and red (brotherhood). See **Flag** (picture: Flags of Africa).
Money: *Currency unit*—Uganda shilling. One shilling = 100 cents.

Like the Ganda, three other ethnic groups in southern Uganda had their own kings until 1967. Most of the people are farmers. But the Karamojong in the northeast and several other ethnic groups in the drier parts of the north lead wandering lives as herders. Karamojong men mat their hair with coloured clay in elaborate patterns.

Many Ugandans practise traditional African religions. But about two-thirds of the people are Christians. A small minority are Muslims. More than half the people can read and write. Uganda's educational system has declined sharply since the early 1970's due to civil unrest in the country. Makerere University is in Kampala.

Land. Most of Uganda is a plateau about 1,200 metres above sea level. Thick forests grow in the south. Most of the north is *savanna* (grassland with low trees), but some northeastern areas are semidesert. Highlands rise near the east and west borders. In the east, Mount Elgon towers 4,321 metres. Margherita Peak rises 5,109 metres in the Ruwenzori Range in the southwest. The Great Rift Valley lies just east of the western highlands and contains the lakes Albert, Edward, and George. The headwaters of the White Nile drain Uganda (see **Nile River**).

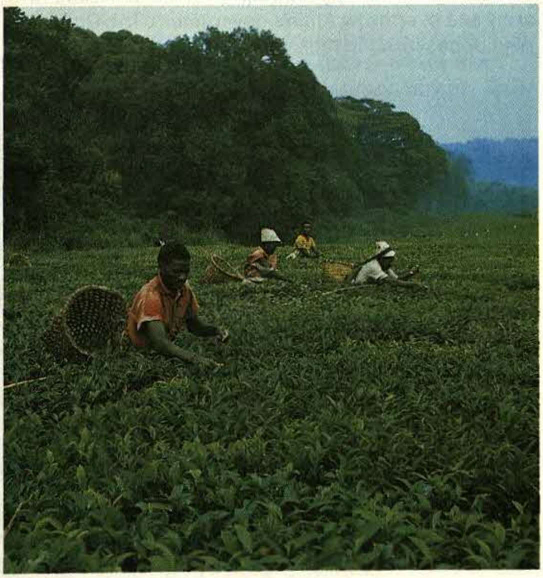
The equator crosses southern Uganda. But because of the high altitude, temperatures are mild. In most areas of the country, the temperature seldom goes above 29 °C at midday, or below 16 °C at night. Most of Uganda receives more than 100 centimetres of rain a year.

Economy. Uganda is an agricultural country. The chief food crops are bananas, beans, cassava, maize, millet, and sweet potatoes. Coffee, cotton, sugar cane, and tea are grown mostly for export. The country has rich deposits of many minerals, but only copper is mined on a large scale. The Owen Falls Dam at Jinja, Uganda's main industrial town, has one of Africa's largest hydroelectric power stations.

Copper ore goes from the mines at Kilembe, near Kasese, to a smelter at Jinja, and then to Kampala and the Kenya seaport of Mombasa. Ships operate on lakes Albert, Kyoga, and Victoria, and on the Albert Nile. Uganda has about 6,120 kilometres of roads.

History. By A.D. 100, the people in parts of what is now Uganda had developed agriculture and the use of iron. Later, they organized a form of government headed by chiefs. Several local kingdoms developed after 1300. The most important early kingdom was Bunyoro-Kitara.

Arab traders came to the area in about 1850. By that time, the Ganda had formed the richest and most powerful kingdom, called Buganda. This kingdom had a large army and a highly developed system of govern-



Tea is one of Uganda's most important cash crops. These Ugandan tea pickers are harvesting the valuable leaves.

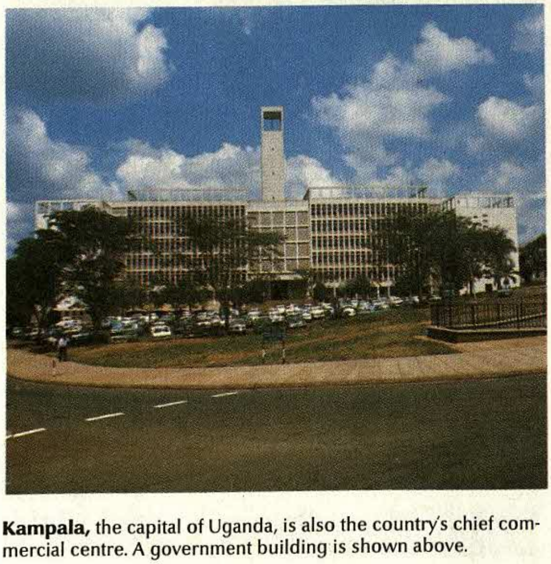
ment. Explorers and missionaries from the United Kingdom arrived in Uganda during the 1860's and 1870's. The UK made Buganda a UK protectorate in 1894. Buganda then helped the UK conquer nearby territory. Uganda attained its present boundaries in 1926. Cash crops, such as coffee and cotton, became the basis for Uganda's economy. After World War II ended in 1945, Africans played an increasingly important part in governing Uganda. Many Ganda wanted their kingdom to become independent.

On Oct. 9, 1962, Uganda became independent. Apollo Milton Obote, a member of a northern ethnic group, became prime minister. Buganda got special powers and was more independent of the central government than the other kingdoms. In October 1963, Sir Edward Mutesa II, the kabaka of Buganda, was elected president. But serious differences arose between the kabaka and Obote. In 1966, Obote dismissed Mutesa and announced a new constitution that made Obote president. Mutesa fled when government troops attacked his palace. Another constitution was adopted in 1967. It made Uganda a republic and abolished the country's traditional kingdoms, including Buganda.

The Uganda Army overthrew Obote in 1971, and set up a military government. Major General Idi Amin Dada, commander of the country's armed forces, headed the new government as president.

In 1972, Amin ordered an estimated 40,000 to 50,000 Asians who had been living in Uganda to leave the country. Many Asians had not become Ugandan citizens, but they owned numerous businesses in the country. After expelling the Asians, Amin used the money from their businesses to reward soldiers who were loyal to him. Amin ruled Uganda as a dictator. Many thousands of Ugandans who disagreed with Amin's policies were killed, at his order or by his supporters.

In 1978, a border dispute led to fighting between Uganda and Tanzania. In 1979, Tanzanian troops, aided by Ugandans who opposed Amin, defeated Uganda's army and overthrew Amin's government. The Ugandans who opposed Amin took control of the country's government. In December 1980, elections for a new civilian government were held. Obote, who had been living in exile, returned to Uganda. His political party won the most seats in the National Assembly, and he became president again. Opponents of Obote began a guerrilla war to oust him.



Kampala, the capital of Uganda, is also the country's chief commercial centre. A government building is shown above.

In July 1985, military leaders overthrew Obote. They dissolved the National Assembly and took control of the government. General Tito Okello became president. But the National Resistance Movement (NRM), led by Yoweri Museveni, began a military campaign to overthrow Okello. NRM troops captured Kampala in January 1986. Museveni became president. By the end of 1986, he had restored peace to most of Uganda, but the country suffered from economic damage that resulted from years of war and political unrest. In February 1989, elections were held for about three-quarters of the members of Uganda's National Resistance Council. Several newly elected members opposed Museveni, but he remained in power.

In 1993, Ronald Muwenda Mutebi became the kabaka of Buganda. He was the first kabaka since the traditional kingdoms were abolished in 1967. However, the new king had only a ceremonial role.

Related articles in ***World Book*** include:

Amin Dada, Idi
Ganda
Kampala
Lake Albert
Lake Edward
Lake Victoria
Nile River
Obote, Apollo Milton

UHF waves. See **Ultrahigh frequency waves.**

Uitlanders. See **Anglo-Boer Wars.**

Ukraine is the second largest country in area in Europe. Only Russia, its neighbour to the east, is bigger. Until 1991, both Ukraine and Russia were part of an even larger country—the Soviet Union. Ukraine lies in southeastern Europe and borders the Black Sea. Kiev is Ukraine's capital and largest city.

About three-quarters of the people are ethnic Ukrainians, a Slavic nationality group that has its own customs and language. Russians are the second largest group and make up about a fifth of Ukraine's population.

Ukraine is famous for its vast plains called *steppes.* The plains are covered with fertile black soil, which has

Facts in brief about Ukraine

Capital: Kiev.
Official language: Ukrainian.
Official name: Ukrayina (Ukraine).
Area: 603,700 km². *Greatest distances*—north-south, 885 km; east-west, 1,335 km. *Coastline*—2,900 km.
Elevation: *Highest*—Mount Goverla, 2,061 m above sea level. *Lowest*—sea level along the coast of the Black Sea.
Population: *Estimated 1996 population*—52,498,000; density, 87 people per km²; distribution, 67 per cent urban, 33 per cent rural. *1989 census*—51,706,742. *Estimated 2001 population*—53,936,000.
Chief products: *Agriculture*—barley, beef and dairy cattle, maize, pigs, potatoes, sugar beet, sunflowers, tobacco, wheat. *Manufacturing*—chemical fertilizers, clothing, iron and steel, machinery, military equipment, processed foods, shoes, refrigerators, television sets, transportation equipment, washing machines. *Mining*—coal, iron, manganese, natural gas, salt.
National anthem: "Shche ne vmerla Ukraina" ("Ukraine has not yet perished").
Money: *Currency unit*—karbovanets.

Kiev, Ukraine's capital and largest city, lies along the Dnepr River, *foreground,* in north-central Ukraine. The city has many attractive parks and high-rise apartment and office buildings, and is a major transportation and manufacturing centre.

made Ukraine one of the world's leading farming regions. Ukraine is also rich in minerals and has large deposits of coal, manganese, and natural gas.

Ukraine is a major producer of iron and steel, machines, ships, chemical fertilizers, grain, sugar beet, dairy products, meat, and wine. In the early 1990's, Ukraine began changing its economy from one owned and controlled by the government to an economy based on free enterprise, in which individual owners and managers run their own businesses.

During the A.D. 800's, Kiev became the centre of a Slavic state called Kievan Rus. In the 1300's, most of Ukraine came under Polish and Lithuanian control. Ukrainian soldiers called Cossacks freed Ukraine from Polish rule in 1648. In the late 1700's, nearly all of Ukraine came under Russian control.

A revolt by Russian Bolsheviks in 1917 led to the establishment of a Communist government in Russia. The next year, Ukraine became an independent country but soon came under the rule of Communist Russia. It later became part of the Soviet Union and was called the Ukrainian Soviet Socialist Republic. In 1932 and 1933, millions of Ukrainians died of famine. For many decades, a Soviet policy called *Russification* forced Ukrainians to use the Russian language and favoured the Russian culture over the Ukrainian one.

In 1991, following an upheaval in the Soviet government, Ukraine declared its political independence. Late that year, it became recognized as an independent country after the breakup of the Soviet Union. It also joined the Commonwealth of Independent States, a loose association of former Soviet republics.

Government

National government. Ukraine has a democratic political system. The government features an executive branch headed by a president with strong powers and a legislative branch consisting of a national parliament.

The president is commander in chief of the military and can issue orders called *edicts* without the approval of parliament in some matters. The people of Ukraine elect the president to a five-year term. Ukrainians 18 years old or older may vote.

The president is assisted by a Cabinet, which the president appoints. A prime minister heads the Cabinet. Other ministers have responsibility for such areas as foreign affairs and the economy. A council called the State Duma advises the president regarding science and technology, law, humanitarian matters, and the economy.

Ukraine's parliament, called the Supreme Council, is the nation's lawmaking body. It has 450 members, who are elected by the voters to five-year terms.

Local government. Ukraine—excluding the Crimea—is divided into 24 regions called *oblasts.* The Crimea, a peninsula in southern Ukraine that separates the Black Sea and the Sea of Azov, has special status as an *autonomous* (self-governing) republic. The Crimea has greater control over its internal affairs than do the oblasts.

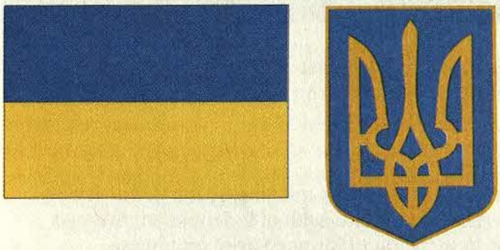
Politics. The most important political organization in Ukraine is a broad movement known as Rukh. It was established in 1989 and includes various political parties, groups, and individual citizens. It has strongly supported democracy for Ukraine. By 1992, however, divisions appeared within Rukh over its structure and approach to democratic reforms.

Ukraine has about 10 registered political parties. They include the Green Party, which promotes environmental issues, and the Ukrainian Republican Party, which favours free enterprise and anti-Communist policies. The Democratic Party of Ukraine supports political democracy.

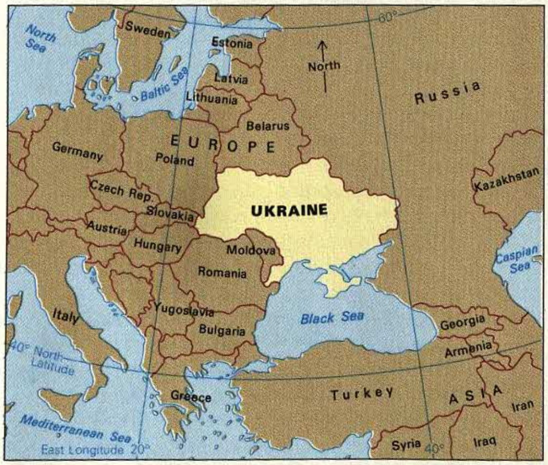
The Christian Democratic Party promotes religious issues, and the Peasant-Democratic Party represents agricultural concerns. The Socialist Party consists of former members of the Communist Party.

Courts. In 1992, Ukraine began creating a legal system based on the rule of law—that is, a set of rules that apply equally to everyone. Under Soviet rule, political considerations affected how the laws were enforced. People who criticized the Communist Party or Soviet government had limited legal rights.

Armed forces. Ukraine has its own army and air force. About 230,000 troops serve in the country's armed forces.



Symbols of Ukraine. The Ukrainian flag was adopted in 1992. The flag's blue stripe symbolizes the sky, and its yellow stripe represents the wheat fields of Ukraine. The coat of arms features a design that dates from the late 900's.



Ukraine is a large country in southeastern Europe. It borders seven other countries and the Black Sea.

People

Population. For Ukraine's total population, see the *Facts in brief* table with this article. The Ukrainian ethnic group makes up 73 per cent of the population. The second largest ethnic group is the Russians, who make up 21 per cent of the population. Other groups include Jews, Belarusians, Moldovans, Bulgarians, and Poles. Rukh and Ukrainian government leaders have encouraged cooperation among ethnic groups. Independent Ukraine has tried to accommodate the cultural concerns of its ethnic minorities.

Ancestry. Most Ukrainians are of East Slavic ancestry. In the A.D. 800's, the East Slavs included the ancestors of the Ukrainians, Belarusians, and Russians. The three groups became separate states in the centuries that followed. Ukrainians are proud of having a nationality separate from the Russians and dislike being mislabelled as "Russians."

Language. Ukrainian became the official language of Ukraine in 1990. From the 1930's to the 1980's, the Soviet policy of Russification forced Ukrainians to use the Russian language in government, schools, and newspapers and television. Many Ukrainians resented this policy. But decades of Russification caused many Ukrainians to know the Russian language better than Ukrainian. In the late 1980's and early 1990's, a growing number of ethnic Ukrainians and non-Ukrainians began studying the Ukrainian language. The government allows ethnic minorities to use their own languages in schools and other local affairs.

Ukrainian has several regional dialects, which vary according to a region's history and the influence of other cultures on the region. Ukrainian dialects spoken by west Ukrainians, for example, show some Polish influence, while eastern dialects reflect more Russian traits.

Way of life

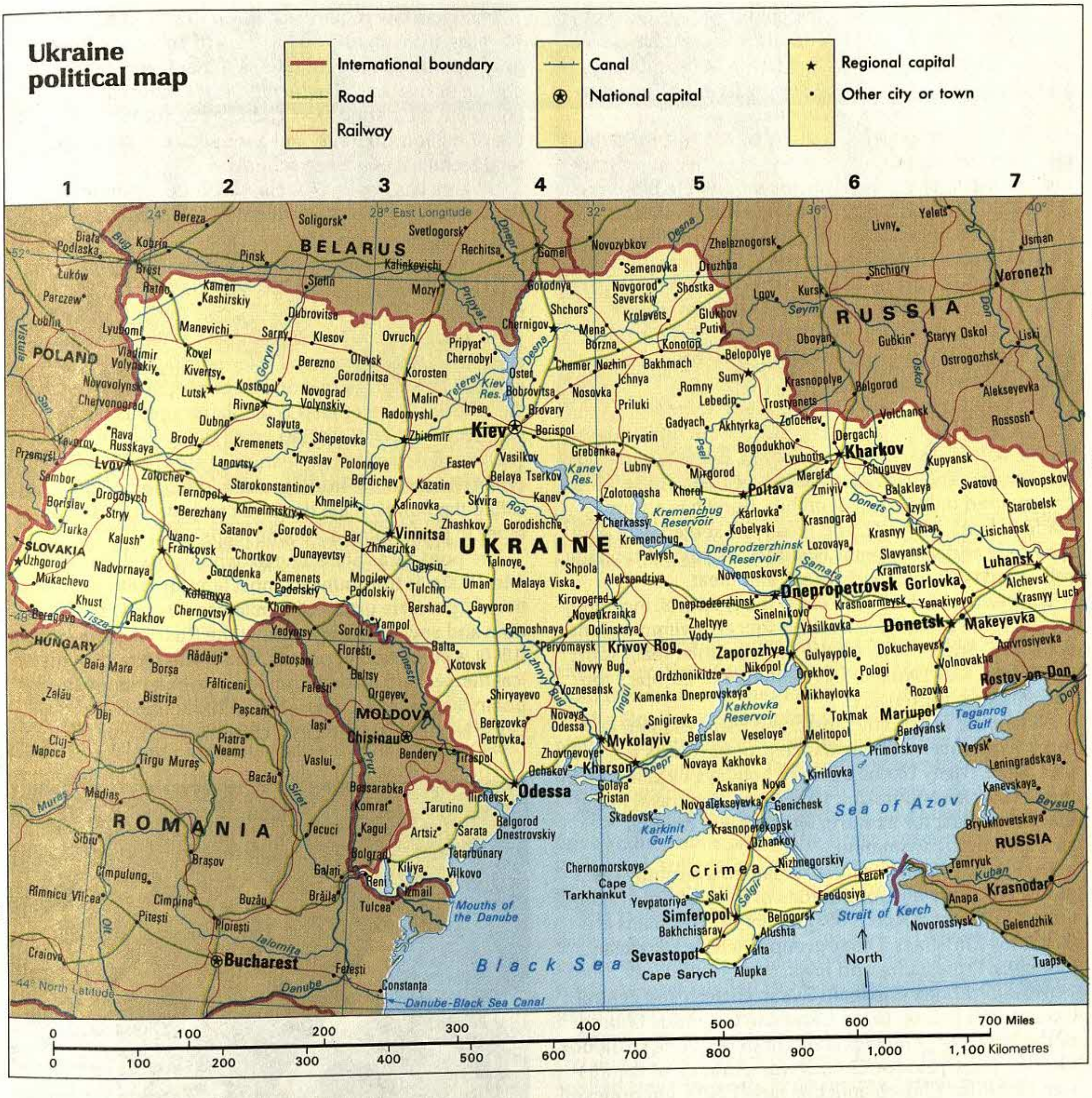
City life. About two-thirds of Ukraine's people live in cities. Ukraine's capital and largest city, Kiev, has about 2.6 million people. Other Ukrainian cities with more than 1 million people are Kharkov (also spelled Kharkiv), Dnepropetrovsk (also spelled Dnipropetrovsk), Odessa, and Donetsk.

High-rise apartments built during Soviet rule are common in Ukrainian cities. Many of the buildings, however, were poorly constructed, and the apartments are small and overcrowded.

Pollution is a major problem in Ukraine, especially in its cities. The quality of air and water have been damaged by factory smoke and other wastes, particularly in the heavily industrialized Donbas region of eastern Ukraine. An environmental movement led by a group called Green World has worked to protect the environment and public health in Ukraine.

Ukraine faces growing unemployment as it moves toward a free-enterprise economy. Poor economic conditions have contributed to a growing crime rate.

Rural life. About a third of Ukraine's population live in rural areas. Western Ukraine is heavily rural. In six of its seven regions, more than half of the people live in the countryside. Small homes are common in rural villages. Most rural Ukrainians work on farms or in the timber industry, or make small handicrafts.



Ukraine map index

Regions*

Cherkassy	B	4
Chernigov	A	4
Chernovtsy	C	2
Crimea (special status)	E	5
Dnepropetrovsk	C	5
Donetsk	C	7
Ivano-Frankovsk	C	2
Kharkov	B	6
Kherson	D	5
Khmelnitskiy	B	2
Kiev	B	4
Kirovograd	C	4
Luhansk	C	7
Lvov	B	1
Mykolayiv	D	4
Odessa	D	4
Poltava	B	5
Rovno	B	2
Sumy	A	5
Ternopol	B	2
Vinnitsa	B	3
Volyn	A	2
Zakarpatye	C	1
Zaporozhye	C	5
Zhitomir	B	3

Cities and towns

Alchevsk	126,000	C	7
Aleksandriya	104,000	C	5
Alupka		E	5
Alushta		E	5
Amvrosiyevka		C	7
Askaniya Nova		D	5
Bakhchisaray		E	5
Bakhmach		A	5
Balakleya		B	6
Belaya Tserkov		B	4
Belogorsk		E	5
Berdyansk	134,000	D	6
Berislav		D	5
Bobrovitsa		B	4
Bogodukhov		B	6
Borispol		B	4
Brovary		B	4
Cherkassy	297,000	B	4
Chernigov	301,000	A	4
Chernobyl	44,000	A	4
Chernomorskoye		E	5
Chernovtsy	257,000	C	2
Chuguyev		B	6
Dergachi		B	6
Dneprodzerzhinsk	284,000	C	5
Dnepropetrovsk	1,187,000	C	5
Dokuchayevsk		C	6
Dolinskaya		C	5
Donetsk	1,117,000	C	7
Dubrovitsa		A	2
Dzhankoy		E	5
Fastov		B	4
Feodosiya		E	6
Genichesk		D	5
Golaya Pristan		D	5
Gorlovka	338,000	C	7
Grebenka		B	4
Gulyaypole		C	6
Irpen		B	4
Ivano-Frankovsk	220,000	C	2
Izyum		B	6
Karlovka		B	5
Kerch	176,000	E	6
Kharkov	1,618,000	B	6
Kherson	361,000	D	5
Khmelnitskiy	241,000	B	2
Kiev	2,616,000	B	4
Kirovograd	274,000	C	4
Korosten		A	3
Kostopol		A	2
Kovel		A	2
Kramatorsk	199,000	C	6
Krasnoarmeysk		C	6
Krasnograd		B	6
Krasnoperekopsk		E	5
Krasnyy Luch	114,000	C	7
Kremenchug	238,000	C	5
Kremenets		B	2
Krivoy Rog	717,000	D	5
Kupyansk		B	7
Lozovaya		C	6
Lisichansk	127,000	B	7
Lubny		B	5
Luhansk	501,000	C	7
Lutsk	204,000	A	2
Lvov	798,000	B	1
Lyubotin		B	6
Makeyevka	427,000	C	7
Malin		B	3
Mariupol	520,000	D	6
Melitopol	176,000	D	6
Mikhaylovka		D	6
Mykolayiv	508,000	D	4
Nikopol	158,000	C	5
Nizhnegorskiy		E	5
Nosovka		B	4
Novoalekseyevka		D	5
Novomoskovsk	146,000	C	5
Novopskov		B	7
Novyy Bug		C	5
Ochakov		D	4
Odessa	1,106,000	D	4
Orekhov		C	6
Oster		A	4
Pologi		C	6
Poltava	317,000	B	5
Pripyat		A	4
Radomyshl		B	3
Rivne	233,000	B	2
Saki		E	5
Sevastopol	361,000	E	5
Simferopol	349,000	E	5
Sinelnikovo		C	6
Skadovsk		D	5
Slavyansk	136,000	C	6
Snigirevka		D	5
Sumy	296,000	A	5
Ternopol	212,000	B	2
Tokmak		D	6
Uzhgorod	120,000	C	1
Vasilkov		B	4
Vinnitsa	379,000	B	3
Volnovakha		C	7
Yalta	89,000	E	5
Yevpatoriya		E	5
Zaporozhye	891,000	C	5
Zhitomir	296,000	B	3
Zolochev		B	2

*Not on map, key shows general location.
Source: 1990 official estimates, except Chernobyl, which is a 1984 official estimate.

The standard of living in the countryside is generally lower than that in the cities. Rural Ukrainians have strong ties to their families and farms. In recent decades, however, many young people have left the countryside to live and work in the cities.

Clothing. Ukrainians generally wear Western-style clothing. But on special occasions, they may wear traditional peasant costumes which feature white blouses and shirts decorated with highly colourful embroidery.

Food and drink. The Ukrainian diet includes chicken, fish, and such pork products as ham, sausage, and bacon. Ukrainians also eat large amounts of potatoes, cooked buckwheat mush called *kasha,* sour rye bread, and sweetened breads. Popular drinks include tea, coffee, cocoa, a special soured milk drink, honey liqueur, and vodka with pepper.

Traditional Ukrainian dishes include *varenyky, borsch,* and *holubtsi.* Varenyky consists of boiled dumplings filled with potatoes, sauerkraut, cheese, plums, or blueberries. The dumplings may be eaten with sour cream, fried onions, or bacon bits. Borsch is a soup made of beet, cabbage, and meat. It is served with sour rye bread and sour cream. Holubtsi are stuffed cabbage rolls filled with rice, buckwheat, and meat.

Recreation. Ukrainians enjoy many sports, including athletics, basketball, ice hockey, soccer, swimming, and volleyball. Soccer is by far the most popular team sport in Ukraine. Kiev Dynamo has been one of Europe's top soccer teams for decades.

Ukrainians also enjoy music, and many of them perform in choruses and folk dance groups. Chess is a popular game. Many Ukrainians take holidays by camping in the Carpathian Mountains. Ukrainians also travel to the Black Sea coast for its warm weather and mineral springs and for swimming.

Religion. Ukrainians have remained a strongly religious people in spite of decades of religious restrictions under Soviet rule. About 80 per cent of Ukrainians are Orthodox Christians. Other groups include Ukrainian Catholics, Protestants, and Jews.

Most Orthodox Christians live in eastern and central Ukraine and belong to the Ukrainian Orthodox Church or the Ukrainian *Autocephalous* (independent) Orthodox Church. The Orthodox Church was a branch of the Russian Orthodox Church until the early 1990's and opposed Ukrainian independence. The Autocephalous Church, however, strongly supported independence. In 1930, Soviet dictator Joseph Stalin banned the Autocephalous Church. But in 1990, it regained legal status.

About 10 per cent of Ukraine's people are Ukrainian Catholics, also known as Uniates or "Greek" Catholics. The Ukrainian Catholics practise Eastern Orthodox forms of worship, but they recognize the authority of the Roman Catholic pope. The church is strongest in western Ukraine.

Education. Since 1989, Ukraine has tried to broaden the use of the Ukrainian language in its schools. In the 1990-1991 school year, however, only 48 per cent of Ukraine's students were taught in Ukrainian. Some areas of eastern Ukraine, such as Odessa and the Donbas region, had no schools that used Ukrainian. In 1992, a few schools that teach in Ukrainian opened in eastern Ukraine. In a growing number of schools, Ukrainian is becoming the primary language of instruction.

Ukrainian law requires children to attend school for 11 years, from about 7 to 18 years of age. After the ninth grade, students may continue a general academic course or may enroll in technical or trade schools to complete their education. Ukraine's schools have more than 7 million students, and about 800,000 students attend technical and trade schools.

Ukraine has about 150 schools of higher education, including 9 universities. About 880,000 students attend these schools. The largest and best-known of Ukraine's universities are Kiev State University, Lvov (also spelled Lviv) State University, and Kharkov (or Kharkiv) State University.

Arts. Ukrainians are well known for their folk arts and crafts. *Pysanky*—Ukrainian Easter eggs decorated with colourful designs—are world famous. Craftworkers in the Hutsul region of the Carpathian Mountains make woodcarvings with striking inlaid designs.

Ukrainian music often features a stringed instrument called the *bandura.* In a popular Ukrainian folk dance called the *hopak,* male dancers compete against each other in performing acrobatic leaps.

The poet Taras Shevchenko, who wrote during the mid-1800's, is the country's most famous cultural and national figure. He urged Ukrainians to struggle for freedom and social equality against the Russians. His *Kobzar* (1840), a collection of poems, dealt with Ukrainian historical themes and made Ukrainian a popular language for poetry and books. Other notable Ukrainian writers include Ivan Franko and Lesia Ukrainka.

Central marketplaces in Ukrainian cities offer shoppers a wide variety of fruit, vegetables, and other foods. Workers in white coats, *above,* serve customers at Kiev's central market.

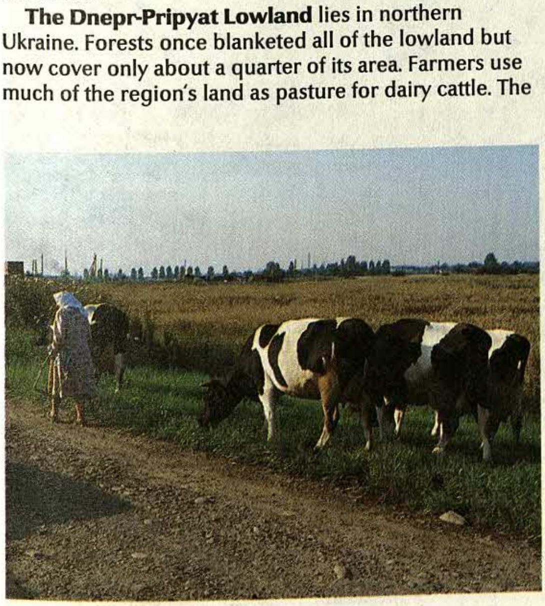
Ukrainian Easter eggs, known as *pysanky,* feature colourful, intricate designs. The woman above draws a design in wax on an egg before dipping the egg in a deep-coloured dye.

Worshipers crowd a Ukrainian Catholic Church, *above.* Ukrainian Catholics use Eastern Orthodox forms of worship. But they recognize the authority of the Roman Catholic pope.

Land

Ukraine lies in southeastern Europe, north of the Black Sea and the Sea of Azov. It covers 603,700 square kilometres. Ukraine consists mainly of a flat, fertile plain. About a third of the land is suitable for growing crops. Ukraine can be divided into six main land regions: (1) the Dnepr-Pripyat Lowland, (2) the Northern Ukrainian Upland, (3) the Central Plateau, (4) the Eastern Carpathian Mountains, (5) the Coastal Plain, and (6) the Crimean Mountains.

The Dnepr-Pripyat Lowland lies in northern Ukraine. Forests once blanketed all of the lowland but now cover only about a quarter of its area. Farmers use much of the region's land as pasture for dairy cattle. The eastern lowland includes the Dnepr River basin and the city of Kiev. The Pripyat River drains the western lowland, which has marshes and forests of pine and oak.



Ukraine has rich farmland, most of which belongs to large, government-controlled farms. But many farmers have small, private plots, where they can rear livestock like the cattle above.

The Northern Ukrainian Upland consists of a low plateau in northeastern Ukraine. Farmers in the region grow wheat and sugar beet and rear livestock. Large deposits of natural gas lie south of Kharkov.

The Central Plateau extends from eastern to western Ukraine and is part of the Great European Plain. Rich, black soils called *chernozem* and sufficient rain make the region Ukraine's most productive farmland.

The Donets Basin, often called the Donbas, lies in the eastern part of the plateau. This area is Ukraine's leading industrial region and includes the cities of Donetsk, Gorlovka (also spelled Horlivka), and Luhansk, and has large deposits of coal.

The Eastern Carpathian Mountains rise in western Ukraine. Ukraine's highest peak, Mount Goverla (also spelled Hoverla), soars 2,061 metres. Farming in the river valleys, rearing livestock, and logging are major economic activities in the region. The mountains have deposits of oil and natural gas.

The Coastal Plain extends along the coasts of the Black Sea and the Sea of Azov and includes most of the Crimean Peninsula. Its coastline has cliffs and many shallow lagoons. The region receives less rain than other parts of Ukraine and sometimes suffers from droughts. The Dnepr River flows through the central plain. Farmers use its water to irrigate crops.

The Crimean Mountains rise in the southern part of the Crimean Peninsula. The mountains climb gradually from the north but slope steeply to the Black Sea in the south. The highest point in this range, a peak called Roman-Kosh, stands 1,545 metres above sea level.

Rivers and lakes. The Dnepr River (Dnipro in Ukrainian), Ukraine's longest river, flows through Ukraine from the north to the Black Sea. It measures 2,200 kilometres long and ranks as Europe's third longest waterway.

Only the Volga and Danube rivers are longer. Ships travel along most of the Dnepr's length. Ukraine's second longest river, the Dnestr (Dnister in Ukrainian), measures 1,408 kilometres. It flows through western Ukraine from the Carpathian Mountains to the Black Sea. Other important waterways include the Yuzhnyy Bug, Desna, Pripyat, and Donets rivers. Ukraine has about 3,000 lakes.

Climate

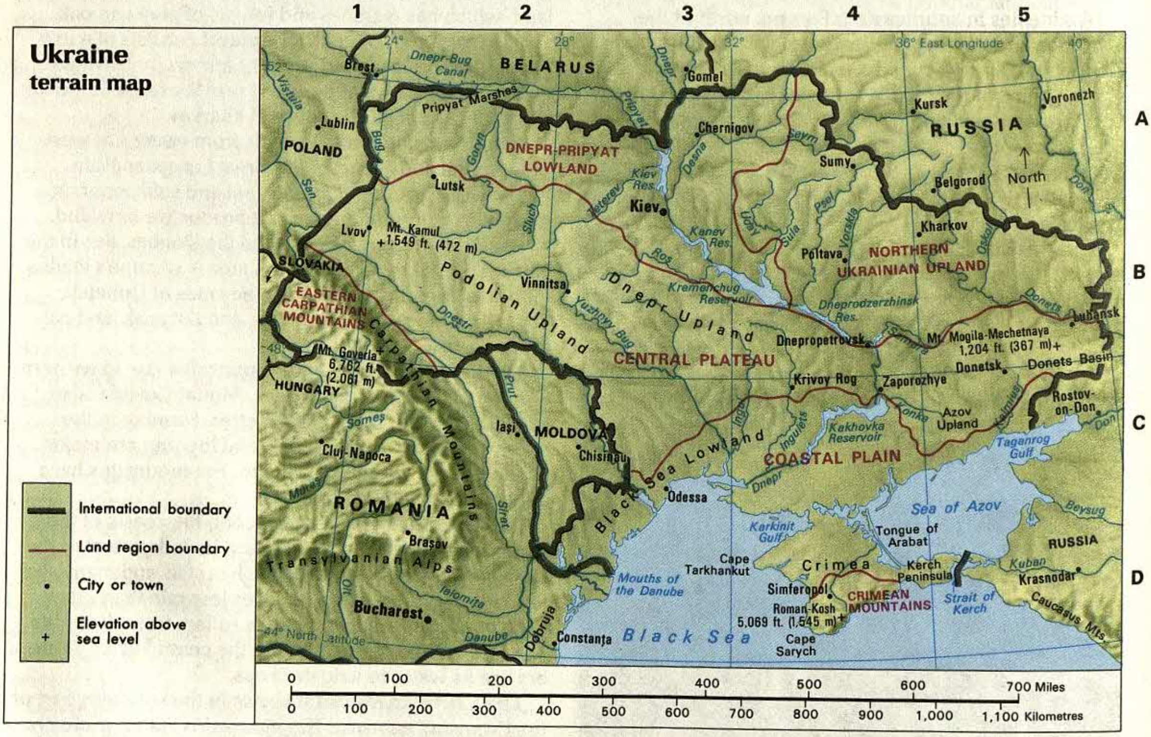
Most of Ukraine has cold winters and warm summers, which favour growing crops. Eastern Ukraine is slightly colder in winter and warmer in summer than western Ukraine. Temperatures in Kharkov in eastern Ukraine average about −7 °C in January and 20 °C in July. But temperatures in Lvov in the west average about −4 °C in January and 18 °C in July. *Precipitation* (rain, snow, and other measurable forms of moisture) ranges from about 76 centimetres a year in the north to about 23 centimetres in the south. Rainfall is highest in June and July. In the Carpathian and Crimean mountains, weather is colder and wetter at higher elevations.

Economy

During Soviet rule, the government owned most factories, farms, and businesses. By the 1980's, many farms and factories operated inefficiently and wasted the country's resources. The economy slumped, and the government struggled to meet demands for consumer goods. In the late 1980's, the Soviet government took steps to increase private ownership of economic activities. After Ukraine gained its independence from the Soviet Union in 1991, it started to change its economy to one based on free enterprise. In 1993, the Ukrainian government introduced a new currency called the *hryvnia* to replace the rouble.

Ukraine has a developed economy with strong industry and agriculture. However, the nation lacks modern technology and equipment in its factories and on its farms. About two-fifths of Ukraine's people work in industry, and about a fifth work in agriculture. Most other Ukrainians have jobs in such service industries as education and health care.

Manufacturing. Ukraine's heavy industries produce iron and steel and such machines as tractors, machine tools, and mining equipment. The machine industry accounts for a third of Ukraine's industrial output and employs about a quarter of Ukraine's workers. Ukraine also produces cars, trucks, buses, locomotives and railway cars, aeroplanes, and ships. Many of Ukraine's heavy industries are in the Donbas region of eastern Ukraine, near mines that supply raw materials. Ukraine also manufactures chemical fertilizers; such processed foods as refined sugar, meat, canned foods, and wine;



Ukraine
terrain map

Physical features

Azov Upland	C	5
Black Sea	D	3
Black Sea Lowland	C	3
Bug River	A	1
Cape Sarych	D	4
Cape Tarkhankut	D	3
Carpathian Mountains	C	1
Danube River	D	2
Desna River	A	3
Dnepr Upland	B	3
Dnepr River	C	4
Dneprodzerzhinsk Reservoir	B	4
Dnestr River	B	2
Donets Basin (Donbas)	C	5
Donets River	B	5
Goryn River	A	2
Ingul River	C	3
Ingulets River	C	4
Kakhovka Reservoir	C	4
Kalmius River	C	5
Kanev Reservoir	B	3
Karkinit Gulf	D	4
Kerch Peninsula	D	4
Kiev Reservoir	A	3
Konka River	C	4
Kremenchug Reservoir	B	3
Mount Goverla	C	1
Mount Kamul	B	1
Mount Mogila-Mechetnaya	B	5
Podolian Upland	B	2
Pripyat Marshes	A	2
Pripyat River	A	3
Psel River	B	4
Roman-Kosh (mountain)	D	4
Ros River	B	3
Samara River	B	4
Sea of Azov	D	5
Seym River	A	4
Sluch River	B	2
Strait of Kerch	D	5
Sula River	B	4
Taganrog Gulf	C	5
Teterev River	B	2
Tongue of Arabat	D	4
Vorskla River	B	4
Yuzhnyy Bug River	B	2

Sandy beaches and warm weather make Yalta a favourite holiday resort for Ukrainians. The city lies on the southern coast of the Crimean Peninsula along the Black Sea.

and consumer goods, including television sets, washing machines, refrigerators, clothes, and shoes.

Ukraine has a strong defence industry. During Soviet rule, defence factories accounted for about a quarter of Ukraine's industrial output. But independent Ukraine plans to cut its military spending and convert many defence factories to manufacture other products.

Agriculture. Ukraine is famous for its agricultural production and is known as the *breadbasket of Europe.* Its moderate climate and rich black soils, called *chernozem,* have made the country one of the world's most productive farming regions.

Most farms in Ukraine are owned and controlled by the government. They include *state farms* and *collective farms.* State farms are managed entirely by the government, which pays wages to farmworkers. Collective farms are owned and managed in part by the workers, who receive wages as well as a share in the farm's profits. Ukraine has about 8,800 collective farms and 2,600 state farms. Collective farms have an average area of about 3,100 hectares. State farms are larger and have more mechanical farm equipment than collective farms. The average area of a state farm is about 3,300 hectares. During Soviet rule, farmers were allowed to have small plots and sell their products for a profit. These private plots became the most productive farming areas in Ukraine.

Ukraine leads the world in sugar beet production and is a leading wheat-growing country. Other important crops include barley, maize, potatoes, sunflowers, and tobacco. Ukrainian farmers also rear beef and dairy cattle, and pigs. Near cities, farmers often grow fruit and vegetables to sell at markets.

Service industries employ more than a quarter of Ukraine's workers. The country's chief service industries include education, scientific research and engineering, health care, transportation, and trade.

Mining. Ukraine is a leading producer of manganese, which is used in making steel. The country also produces nickel and titanium. Huge coal deposits lie in the Donbas, the centre of Ukraine's heavy industry. Ukraine also mines iron ore, natural gas, and salt.

Fishing. Ukrainian fishing fleets operate mainly in the Antarctic and Indian oceans, and in the Black Sea and Sea of Azov. Ukrainians also fish in Ukraine's rivers and lakes. Ocean fleets catch mackerel and tuna. River fishing is most important on the Dnepr and lower Danube rivers. The chief commercial fish from seas and rivers include bream, carp, perch, pike, and trout.

Energy sources. Coal, natural gas, and petroleum have long been important sources of electric power in Ukraine. The country also has hydroelectric plants located mainly on the Dnepr River. During the 1980's, nuclear power plants began providing an important new source of energy. Today, these plants produce about a quarter of Ukraine's electricity. Many Ukrainians, however, oppose the use of nuclear energy because of an accident at the Chernobyl nuclear power plant in north-central Ukraine in 1986.

Ukraine imports much oil and natural gas from Russia and Tajikistan. In 1992, Ukraine signed an agreement with Iran to build a pipeline through Azerbaijan to bring Iranian oil and gas to Ukraine.

Trade. Ukraine's chief exports are wheat, sugar beet, coal, construction equipment, and manufactured goods. Ukraine imports oil, natural gas, wood products, rubber, and consumer goods. Ukraine's major trading partners include Canada, Germany, Hungary, Iran, Poland, Russia, and Tajikistan.

Transportation and communication. Ukraine has a well-developed transportation system. Most of the system is owned by the government. Ukraine's highways include about 147,000 kilometres of paved roads. About a third of Ukraine's people own cars or motorcycles. Buses and taxis are common in larger cities. Kiev and Kharkov have underground railway systems. A large railway network connects major cities and industrial centres. Ukraine's chief airports are at Borispol, near Kiev, and at Kharkov and Odessa. Major ports include Illichevsk, Kerch, Kherson, Mariupol, Mykolayiv, Odessa, Sevastopol, and Yalta.

Ukrainian newspapers are privately owned. Leading daily papers include *Pravda Ukrainy, Rabochaya Gazeta, Radyanska Ukraina, Silski Visti,* and *Vilna Ukraina.* The

A combine harvests wheat on a farm in the Khmelnitskiy region of Ukraine. The region lies in the Central Plateau, which has the country's most productive farmland.

A natural gas pipeline links Ukraine with gas fields in Siberia in northern Russia. Ukraine uses natural gas to generate electricity for homes and industry.

country has an average of one radio for every four people. Almost all Ukrainian families own a TV set.

History

Early days. Human beings have lived in the Ukraine region for about 300,000 years. One of the earliest cultures was that of the Trypillians, who lived in southwestern Ukraine from about 4000 to 2000 B.C. The Trypillians grew crops for a living, decorated pottery, and made drills for boring holes in wood and stone.

By about 1500 B.C., nomadic herders occupied the region. They included a warlike, horse-riding people called the Cimmerians. The Scythians, a people from central Asia, conquered the Cimmerians about 700 B.C. Between 700 and 600 B.C., Greeks started colonies on the northern coast of the Black Sea. But the Scythians controlled most of the region until about 200 B.C., when they fell to a group called the Sarmatians. The region was invaded by Germanic tribes from the west in A.D. 270 and by the Huns, an Asian people, in 375.

Kievan Rus. During the A.D. 800's, a Slavic civilization called Rus grew up at Kiev and at other points along river routes between the Baltic Sea and the Black Sea. Kiev became the first of the East Slavic states and was known as Kievan Rus. Scandinavian merchant-warriors called Varangians (also known as Vikings) played a part in organizing the East Slavic tribes into Kievan Rus. Oleg, a Varangian, became its first ruler in 882. During the 900's, other states recognized Kiev's leadership.

Vladimir I (Volodymyr in Ukrainian), the ruler of the Russian city of Novgorod, conquered Kievan Rus in 980. Under his rule, the state became a political, economic, and cultural power in Europe. In 988, Vladimir became a Christian and made Christianity the state religion. Before the East Slavs became Christians, they had worshipped idols and nature spirits. In 1240, Mongol tribes known as Tatars swept across the Ukrainian plains from the east and conquered the region.

Lithuanian and Polish rule. After the fall of Kievan Rus, several *principalities* (regions ruled by princes) developed in the Ukraine region. The state of Galicia-Volhynia grew in importance in what is now western Ukraine. In the 1300's, however, Poland took control of Galicia. Lithuania seized Volhynia and later, Kiev. Under Polish and Lithuanian rule, Ukrainian peasants were bound to the land as *serfs,* farmworkers who were not free to leave the land they worked. By 1569, Poland ruled all of the region.

Many discontented peasants joined bands of independent soldiers that became known as Cossacks. They occupied the territory that lay between the Poles and the Tatars. In 1648, a Cossack named Bohdan Khmelnitsky led an uprising that freed Ukraine from Polish control. In 1654, Khmelnitsky formed an alliance with the *czar* (emperor) of Russia against Poland.

Russian rule. Ukraine was divided between Poland and Russia in 1667. Poland gained control of lands west of the Dnepr River, while Ukrainian lands east of the Dnepr had self-rule but came under Russian protection. By 1764, Russia abolished Ukrainian self-rule. In the 1790's, Russia gained control of all of Ukraine except Galicia, which Austria ruled from 1772 until 1918.

Russia favoured its language and culture over those of the Ukrainians and other peoples. From 1863 to 1905, it banned publications in Ukrainian. The Austrians, however, allowed the Ukrainians greater freedom than did the Russians. As a result, Galicia became a major centre of Ukrainian culture during the 1800's.

Soviet rule. Russian Bolsheviks established a Communist government in Russia after the October Revolution of 1917. In 1918, the Ukrainians formed an independent, non-Communist country called the Ukrainian People's Republic. Communist Russia, however, had superior military power and seized eastern and central Ukraine by 1920. The rest of Ukraine came under Polish, Czechoslovak, and Romanian control.

Ukraine became one of the four original republics of the Soviet Union in 1922. During the 1920's, the Soviet government encouraged Ukrainian culture and the use of the Ukrainian language to weaken opposition to the

Textile manufacturing is an important light industry in Ukraine. Mills such as the one in Kherson, *above,* provide fabrics for making clothing and other consumer goods.

Communist system. By the 1930's, however, Soviet dictator Joseph Stalin began his policy of Russification, which imposed the Russian language and culture on the Ukrainian people.

In the late 1920's and early 1930's, the Communist government took over privately owned farms in Ukraine and combined them into larger, state-run farms. This programme, called *collectivization,* brought great hardship to Ukraine's people. Several hundred thousand Ukrainian farmers resisted the seizure of their land and were sent to prison labour camps. In 1932 and 1933, the Soviet government seized grain and food from people's homes, causing a major famine. Between 5 million and $7\frac{1}{2}$ million Ukrainians died of starvation.

World War II. Nazi Germany occupied Ukraine from mid-1941 to mid-1944, during World War II. About 5 million Ukrainian civilians, including 600,000 Ukrainian Jews, were killed during the war. The Ukrainian Insurgent Army, a force of about 40,000 soldiers, fought both Germany and the Soviet Union for Ukrainian independence. It continued fighting the Soviets until the 1950's.

By the end of World War II in 1945, the Soviet Union had taken control of many parts of Ukraine. That year, Soviet Ukraine became one of the original members of the United Nations. In 1954, Russia transferred control of the Crimea to Ukraine.

Protest movements. Many Ukrainians opposed Soviet Russian control and the limits on Ukrainian culture. In the 1960's, a protest movement developed to advance human rights and the rights of the Ukrainian people. Although thousands of protesters were arrested, the movement continued during the 1970's and 1980's.

The Chernobyl disaster. In 1986, an explosion and fire at the nuclear power plant in Chernobyl, near Kiev, released large amounts of radioactive material into the atmosphere. Nuclear fallout from the accident caused many health and environmental problems. About 6,000 to 8,000 people died as a result of the explosion and its aftermath. The disaster caused high rates of cancer and other illnesses in Ukraine, Belarus, and Russia.

Independence. A Ukrainian nationalist movement began to gain strength during the late 1980's. Ukrainians demanded more control over Ukraine's government, economy, and culture. In 1990, Ukraine's parliament passed a declaration of *state sovereignty.* This declaration stated that Ukraine would follow its own laws if they came in conflict with those of the Soviet Union.

In August 1991, conservative Communists failed in an attempt to overthrow a reform-minded Soviet government. The failed coup renewed demands for self-rule among the Soviet republics. Soon afterward, Ukraine's parliament declared Ukraine independent. Several other republics made similar declarations. On December 1, more than 90 per cent of Ukrainians voted in favour of independence. Leonid Kravchuk, a former Communist official who became a Ukrainian nationalist and a democrat, was elected president.

On Dec. 25, 1991, the Soviet Union was dissolved. Ukraine and most of the other former Soviet republics created a loose association called the Commonwealth of Independent States (C.I.S.) to deal with economic and military problems caused by the breakup. Many Ukrainians viewed the C.I.S. as a temporary association. They feared a commonwealth led by Russia would limit Ukrainian independence. Ukraine and Russia argued over many issues, including how much of the Soviet national debt each country should assume and how the Soviet Navy's Black Sea fleet should be divided. In May 1992, Russia's Supreme Soviet voted to declare the

Important dates in Ukraine

A.D. 800's East Slavs established the state of Kievan Rus.
988 Vladimir I made Christianity the state religion of Ukraine.
1240 The Mongols destroyed Kiev and conquered Ukraine.
1569 Ukraine came under Polish control.
1648 A Ukrainian Cossack revolt freed Ukraine from Polish rule.
1790's Russia gained control of most of Ukraine.
1918 Ukraine became an independent country after a revolution in Russia in 1917. But Communist Russia regained control of most of Ukraine by 1920.
1922 Ukraine became one of the four original republics of the Soviet Union.
1932-1933 Millions of Ukrainians died from a famine after Soviet authorities took food from their homes.
1941-1945 The Ukrainian Insurgent Army fought for Ukrainian independence against German and Soviet forces during World War II. It continued fighting the Soviets until the early 1950's.
1960's Ukrainians began a protest movement against Soviet rule. Soviet authorities imprisoned thousands of protesters.
1991 The Ukrainian parliament declared Ukraine an independent country. The Soviet Union was dissolved.

Soviet government's 1954 grant of Crimea to Ukraine an illegal act. Ukraine opposed this decision.

In 1992, Ukraine and two other former Soviet republics with nuclear weapons—Belarus and Kazakhstan—agreed to eliminate all nuclear weapons on their territories within seven years. They also agreed to become parties to the Treaty on the Non-Proliferation of Nuclear Weapons, a United Nations treaty that forbids the spread of nuclear weapons. Ukraine was the last country to ratify the treaty, in 1994, and it has turned over its short-range Soviet nuclear weapons to Russia for destruction. Ukraine has also begun to return the warheads of its long-range nuclear weapons, though it has kept the launch vehicles for these weapons. In 1994, Leonid Kuchma was elected to succeed Kravchuk as Ukraine's president.

Related articles in ***World Book*** include:

Azov, Sea of
Bessarabia
Black Sea
Cimmerians
Commonwealth of Independent States
Cossacks
Crimea
Dnepr River
Dnepropetrovsk
Dnestr River
Donetsk
Galicia
Kharkov
Kiev
Lvov
Odessa
Ruthenia
Sevastopol
Shevchenko, Taras
Union of Soviet Socialist Republics
Vladimir I
Yalta

Outline

- **I. Government**
  - A. National government
  - B. Local government
  - C. Politics
  - D. Courts
  - E. Armed forces
- **II. People**
  - A. Population
  - B. Ancestry
  - C. Language
- **III. Way of life**
  - A. City life
  - B. Rural life
  - C. Clothing
  - D. Food and drink
  - E. Recreation
  - F. Religion
  - G. Education
  - H. Arts
- **IV. Land**
  - A. The Dnepr-Pripyat Lowland
  - B. The Northern Ukrainian Upland
  - C. The Central Plateau
  - D. The Eastern Carpathian Mountains
  - E. The Coastal Plain
  - F. The Crimean Mountains
  - G. Rivers and lakes
- **V. Climate**
- **VI. Economy**
  - A. Manufacturing
  - B. Agriculture
  - C. Service industries
  - D. Mining
  - E. Fishing
  - F. Energy sources
  - G. Trade
  - H. Transportation and communication
- **VII. History**

Questions

Why is Ukraine called the *breadbasket of Europe*?
Who led a Cossack rebellion against Polish rule in 1648?
What is the Donbas? Why is it important to Ukraine?
Which groups in Ukraine are descended from the East Slavs?
What is the largest religious group in Ukraine?
What is Rukh?
Who is Ukraine's most famous cultural and national figure?
Why do many Ukrainians know the Russian language better than the Ukrainian language?
When did Ukraine gain its independence?

Ukrainian Soviet Socialist Republic. See **Ukraine.**

Ukulele is a four-stringed musical instrument related to the guitar. A player strums the ukulele with the fingers of one hand. With the fingers of the other hand, the player picks out chords on the finger board along the neck of the instrument. Most written ukulele music consists of chord symbols that indicate finger positions instead of notes. The ukulele was developed from a small guitar brought to Hawaii by the Portuguese in the late 1800's. The ukulele is used mainly to accompany folk and popular singing.

The ukulele looks somewhat like a small guitar. It is played by strumming the four strings with the fingers.

Ulan Bator (pop. 515,000) is the capital and largest city of Mongolia. It is also Mongolia's centre of culture and industry. The city lies in the northeastern part of the country (see **Mongolia** [map]).

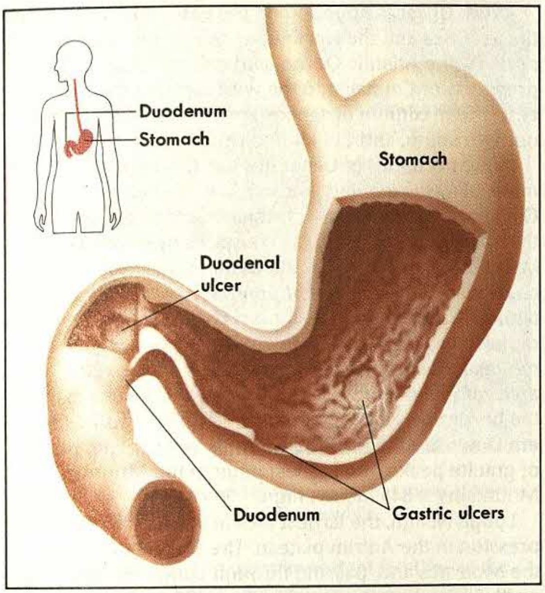
Large government buildings line Ulan Bator's central square. The city has a university, a national theatre, and several museums. Its manufactured products include furniture, cast iron, paper, pharmaceutical products, soap, and textiles. Meat packing is also important.

In 1639, a Lamaist monastery was built on the site of what is now Ulan Bator. Lamaism is a form of Buddhism. A settlement grew up around the monastery, and it became an important trade centre. The city was called Urga until 1924, when Mongolia became an independent republic. It was then named Ulan Bator by Sukhe Bator, the leader of the fight for independence (see **Mongolia** [History]).

Ulbricht, Walter (1893-1973), was the leader of East Germany from 1960 to 1971. He ruled as head of the Communist-dominated Socialist Unity Party. In 1961, Ulbricht ordered the building of the Berlin Wall, which separated the eastern and western sectors of the city.

Ulbricht was born in Leipzig, Germany. He helped to found the German Communist Party in 1919, and studied Communism in the Soviet Union in the 1920's. Ulbricht was exiled from Germany from 1933 to 1945. He served with Communist forces in the Spanish Civil War (1936-1939). He returned to Germany in 1945, where he helped to form the Socialist Unity Party. Ulbricht served as the deputy premier of East Germany from 1949 to 1960.

Ulcer is an open sore in the skin or mucous membrane. An ulcer forms when surface tissue dies, leaving a raw, inflamed area that heals slowly.



Peptic ulcers are open sores in the digestive system. There are two main types of peptic ulcers. *Duodenal ulcers* form in the duodenum, the upper part of the small intestine. *Gastric ulcers* develop in the stomach. Both types result from the erosive action of two digestive juices, hydrochloric acid and pepsin.

Probably the best-known kinds of ulcers are *peptic ulcers,* which occur in the digestive system. There are two main types of peptic ulcers. *Duodenal ulcers* form in the duodenum, the upper part of the small intestine. *Gastric ulcers* develop in the stomach. During digestion and at certain other times, the stomach produces hydrochloric acid and an enzyme called *pepsin.* These powerful digestive juices can eat through the lining of the stomach and duodenum. Normally, mucous secretions protect the stomach and duodenum from the effects of digestive juices. Secretions of bicarbonate into the duodenum also neutralize these juices.

Most people who have peptic ulcers are also infected with *Helicobacter pylori,* a bacterium that lives in the stomach. Scientists believe that this bacterium is associated with the development of ulcers, but they are uncertain exactly how. The bacterium may cause an increase in stomach acid, or it may produce a toxin that harms the stomach lining. *H. pylori* infection occurs worldwide, but it is most common in developing countries.

Other agents that increase the risk of getting ulcers include aspirin and nonsteroidal anti-inflammatory drugs. These widely used medications can inhibit function of *prostaglandins,* chemical compounds found throughout the body. Prostaglandins in the stomach control the production of stomach acid.

Most peptic ulcers cause pain in the upper part of the abdomen. The pain usually occurs when the stomach is empty, either between meals or at night. Medications that neutralize stomach acid or suppress its secretion relieve the pain temporarily. Eating may also ease the pain. If *H. pylori* is present, doctors may prescribe antibiotics. People can reduce the risk of ulcers by eliminating cigarette smoking and the consumption of alcohol.

Patients with peptic ulcers may develop such complications as blockage of the stomach or duodenum, internal bleeding, and perforation of the stomach wall.

Other kinds of ulcers include *chronic leg ulcers,* which may result from poor blood circulation caused by diabetes, hardening of the arteries, or varicose veins. *Decubitus ulcers,* commonly called *bedsores,* afflict many patients who are confined to bed or a wheelchair.

See also **Bedsore; Canker; Stomach** (Peptic ulcers); **Typhoid fever.**

Ulithi atoll is one of the western Caroline Islands, which lie in the Pacific Ocean. Ulithi consists of a large atoll, with 474 square kilometres of lagoon and some detached reefs and islets. The land area totals less than 5 square kilometres. About 710 Micronesians live on the islets. They raise food for their own use and make copra for trade. The United States took control of Ulithi as part of a United Nations trusteeship in 1947. In 1980, Ulithi and other Caroline Islands formed the Federated States of Micronesia. In 1986, these islands became a self-governing political unit in free association with the United States. See **Pacific Islands** (map).

Ulm, Charles (1897-1934), an Australian aviator, helped to pioneer flying in Australia. During the late 1920's, he flew with fellow Australian Charles Kingsford Smith. They made a record-breaking flight round Australia in 10 days $5\frac{1}{2}$ hours in 1927, and the first trans-pacific flight in 1928 (see **Kingsford Smith, Sir Charles**). In 1934, Ulm flew from Britain to Australia in a new record time of 6 days 17 hours 45 minutes, and made the first official airmail flight between Australia and New Zealand. Charles Thomas Phillipe Ulm was born in Melbourne. He was killed on a flight from the United States to Australia.

Charles Ulm

Ulna. See **Arm.**

Ulster is one of the four provinces of Ireland. It consists of 9 of the 32 counties that make up the whole island of Ireland. Six of Ulster's counties form Northern Ireland, which is a part of the United Kingdom. These counties are Antrim, Armagh, Down, Fermanagh, Londonderry, and Tyrone. The other three counties—Cavan, Donegal, and Monaghan—form part of the Republic of Ireland. Each of these counties has an article in *World Book.* Belfast is the largest city in Ulster.

People and government. Most of Ulster's people are of English, Scottish, or older Irish descent. The majority of the people are Protestants. In Northern Ireland, the proportion of Protestants is about two-thirds. The dominant Protestant group is the Presbyterians. Other groups include members of the Church of Ireland and Methodists. Most of the remainder of Ulster's people are Roman Catholics. In Ulster counties within the republic, about seven out of eight people are Roman Catholics.

English is the only everyday language used in Northern Ireland. However, Irish is taught in some schools

Facts in brief about Ulster

Population: *1991 census—Northern Ireland*—1,569,971; *Ulster counties in Republic of Ireland*—232,012.
Area: 21,778 km^2.
Counties: *In Northern Ireland,* Antrim, Armagh, Down, Fermanagh, Londonderry, Tyrone. *In the Republic of Ireland,* Cavan, Donegal, Monaghan.
Largest towns: Belfast, Derry.
Chief products: *Agriculture*—cattle, dairy products, fruit, pigs, poultry, sheep. *Manufacturing and processing*—aircraft cables, chemicals, clothing, light machinery, ships, textiles. *Fishing*—herring, lobsters, mackerel.

there. In the republic counties of Ulster, the western part of Donegal has an extensive *Gaeltacht* (Irish-speaking region) with a population of 26,000. In eastern Donegal and in Cavan and Monaghan, Irish is taught in schools.

Economy. Linen and shipbuilding are traditionally important in eastern Ulster, where most of the province's industry is concentrated. But now, its industries include aircraft manufacture, food and drink processing, various types of engineering, china and footwear manufacture, and the production of electronics equipment, furniture, offshore oil exploration equipment, measuring and optical instruments, textiles, tiles, and tyres. Belfast is a main shopping centre and a centre for printing.

In southern and western Ulster, half the industry is in Donegal, which is famous for tweeds and carpets. Monaghan produces clothing, furniture, and processed foods. Cavan also produces processed foods, along with electrical transformers and iron and steel products.

Farmers in Ulster grow barley, oats, and potatoes. Pigs, poultry, and cattle are the most important livestock. In Ulster, within the republic, farmers also rear sheep. Monaghan is Ireland's main centre for poultry-rearing. Killybegs, in Donegal, is a major fishing port.

Ulster's chief ports, Belfast and Larne, have passenger and freight links with several ports in England and Scotland and with Holyhead in Wales. Aldergrove airport has flights to both Europe and the United States. State-owned or state-sponsored organizations run road and rail transport within both Northern Ireland and the rest of Ulster.

Land. Ulster is bounded on the east and northeast by the Irish Sea and the North Channel, on the west and north by the Atlantic Ocean, and on the south by the provinces of Connacht to the west and Leinster to the east. The maximum distances are 174 kilometres from north to south, and 214 kilometres from west to east.

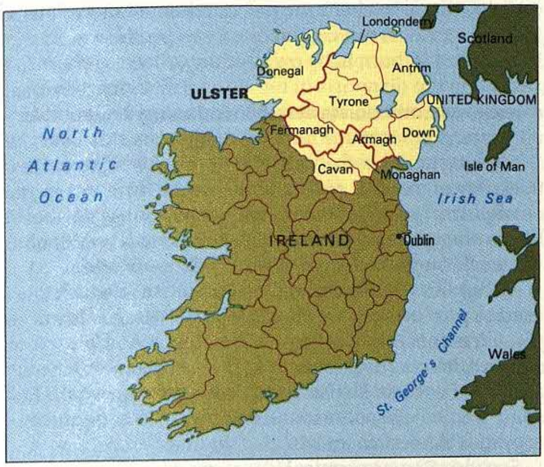
In the northeast of Ulster lies the Antrim plateau, made of *basalt* (cooled volcanic lava) and cut by the Glens of Antrim running northeastward to the sea. On the north coast of Antrim is the series of extraordinary basalt columns known as the Giant's Causeway. The coastline of Antrim and Londonderry consists of mountains and basalt and limestone cliffs. Limestone also underlies much of Fermanagh. Donegal has a rugged, mountainous northern part and a less rugged southern area with long beaches. The Sperrin Mountains mark the border between Londonderry and Tyrone. In southern Down are the Mourne Mountains, a striking range of granite peaks. The highest point in the Mourne Mountains is 848 metres high.

Lough Neagh, the largest lake in Ireland, lies in a depression in the Antrim plateau. The River Bann rises in the Mournes and, passing through Lough Neagh, flows north to the Antrim coast. The River Foyle flows northeast from Lifford, Donegal, into Lough Foyle, a sea inlet that separates Donegal from Londonderry. The River Erne drains much of Fermanagh and southern Ulster. Two lakes, Upper Lough Erne and Lower Lough Erne, are on this river. The River Lagan, on which Belfast stands, rises in a range of hills called Slieve Croob. On the east coast of the province, Strangford Lough, a sea inlet with many small islands, separates the Ards Peninsula from the rest of Down.

Climate. Rainfall in Ulster averages 810 millimetres a year. In the west, it can reach above 2,000 millimetres, but eastern Ulster is one of the driest places in Britain and Ireland. Average daily temperatures range between 4° C in January and 14.5° C in July.

History. People settled in present-day Ulster in prehistoric times. In early Christian times, it was, according to Irish legend, the site of a kingdom called Uladh. In the A.D. 300's, Niall of the Nine Hostages is said to have carved out a kingdom in western Ulster. Niall's descendants, the O'Neills, and another clan called the

Whitehead, in Antrim, is one of the many delightful seaside resorts in Ulster. The town lies on the shore of Belfast Lough and is surrounded by pleasant countryside.



Ulster is a province of Ireland consisting of the whole of Northern Ireland and three counties of the republic.

O'Donnells, became the most important families in the Ulster region. The Scots originally came from Ulster, and St. Patrick, St. Ninian, and St. Columbanus were all associated with the province.

The Vikings raided Ulster in the late 700's. From the 1100's, the Anglo-Normans built castles at Carrickfergus, Downpatrick, and Dundrum. In the 1500's, Ulster resisted the English conquest of Ireland. But in 1603, Hugh O'Neill, the leader of the Irish in Ulster, finally gave up the struggle. In 1610, the government of King James I began the *plantation* (colonization) of Ulster. In 1641, Ulster rebelled. In 1689, the Roman Catholic King James II's forces unsuccessfully besieged Derry. On July 12, 1690, James II lost the Battle of the Boyne. The date is still marked annually by Protestant parades in Northern Ireland.

Ulster officially became part of the United Kingdom in 1801. In 1921, the six counties of eastern Ulster opted to remain within the United Kingdom as Northern Ireland. The rest of Ulster became part of an independent Irish state.

See also **Antrim; Armagh; Cavan; Donegal; Down; Fermanagh; Londonderry; Monaghan; Tyrone.**

Ulster Volunteers. See **Ireland, History of.**

Ultima Thule was the name given in ancient literature to the most northern of known lands. A Greek sailor named Pytheas spoke of it in the 300's B.C. He said that the days and nights in Ultima Thule lasted for six months, and that the sea there was so thick the rowers could not get through it. Some think that Pytheas was referring to Norway or Iceland. Others believe Ultima Thule was one of the Shetland Islands, which lie north of Scotland. Today, Ultima Thule is used to mean any distant place or faraway goal.

See also **Exploration** (The ancient Greeks).

Ultimatum is a final proposition or demand made by one of two negotiating parties. The term is usually used in international affairs. It is a forceful and definite statement of one country's position. The demand is usually accompanied by a threat of war or some other strong action if the conditions specified in the demand are not accepted by a given deadline.

Ultrahigh frequency waves (UHF) are a type of short radio wave. Their frequency ranges from 300 to 3,000 *megahertz.* One megahertz equals 1 million *hertz* (cycles per second). The wavelength of UHF waves measures only from 0.1 to 1 metre.

UHF waves are widely used in television broadcasting. UHF waves also are used in aircraft and ship navigation and for police and emergency communication. Cellular telephone networks also use UHF. In some cases, UHF waves provide a communication link between vehicles travelling in space and monitoring stations located on the earth.

UHF waves mainly travel in a straight line, and they cannot pass through the earth. For this reason, the transmission of UHF waves between two points on the earth is limited by the curvature of the earth to 80 kilometres or less. Certain radio waves that have frequencies lower than those of UHF waves can be reflected off the upper layers of the atmosphere to reach beyond the earth's curvature. As a result, they can be transmitted much farther than UHF waves in some cases.

See also **Short waves; Television** (Broadcasting).

Ultramarine is a blue pigment or colouring matter now prepared by artificial means. It usually has a reddish tinge. Ultramarine is made by *calcining* (heating) various combinations of China clay, sodium carbonate, carbon, and sodium sulphate until they form a dry powder. Ultramarine was once ground from the rare mineral lapis lazuli. This method produced a brilliant, durable blue colour, which was prized by artists, but was very expensive. See also **Lapis lazuli.**

Ultramicroscope is an instrument that allows a person to see objects much smaller than those that can be seen under an ordinary microscope. Scientists use this microscope to study such *colloidal particles* as fog drops, smoke particles, and paint pigments that float in liquids or gases (see **Colloid**). Objects as small as 5 *millimicrometres* in diameter can be seen with an ultramicroscope. One millimicrometre equals 1 billionth of a metre.

The ultramicroscope consists of a compound microscope and a high-intensity light system. In most cases, the strong light originates from an arc lamp. The light is focused into a thin beam and directed at the particles from the side of the microscope. As the beam passes through the particles, it produces a cone of light, because of the light-scattering effect of the particles. This phenomenon is called the *Tyndall effect.* The particles are observed by the light they scatter. The particles are viewed against a black background and appear as tiny bright dots of light, without structural detail. The first ultramicroscope was designed in 1903 by two German scientists, Richard Zsigmondy and Henry Siedentopf.

See also **Arc light; Microscope.**

Ultrasound is sound with *frequencies* above the range of human hearing. Frequency refers to the number of sound waves a vibrating object produces per second. It is measured in terms of *hertz.* One hertz equals one *cycle* (vibration) per second. Most people can hear sounds with frequencies between 20 and 20,000 hertz. However, ultrasound has frequencies above 20,000 hertz. Scientists have developed many uses for ultrasound, especially in medicine and industry.

In addition to its high frequency, ultrasound has other qualities that distinguish it from the sound that is audible to human beings. For example, ultrasonic waves are shorter than the waves of audible sound. When the short waves of ultrasound encounter small obstacles, they are easily reflected, forming echoes. The longer waves of audible sound, however, flow around small obstacles, with very little reflection.

Bats, porpoises, and certain other animals that hear frequencies above 20,000 hertz make use of ultrasound. Some bats give off short, ultrasonic cries that bounce off nearby objects, making echoes. They use these echoes to find insects or other food and to avoid obstacles.

Producing ultrasound. Scientists have invented whistles and other devices that produce ultrasound. One commonly used device, called an *ultrasonic transducer,* converts electric energy into ultrasonic waves. Some ultrasonic transducers include a special disc made of quartz or of a ceramic material. When an electric signal is applied to it, the disc vibrates so rapidly that ultrasonic waves are created.

Many transducers can also convert ultrasonic waves into electric energy. These transducers give off ultrasonic waves at the same time that they change the returning echoes back to electricity. Strong echoes create stronger electric pulses than weak ones do. A computer registers such data as the intensity of the electric pulses and the direction of the returning echoes. The computer can then provide information on the substances that reflected the ultrasonic waves. Some of these computers transform the data they receive into images on a screen.

Uses. Ultrasound has many uses. They can be divided into two basic groups—passive uses and active uses.

Passive uses of ultrasound include those in which it is used only to obtain information. For example, doctors use ultrasound to check the development of unborn babies. Special ultrasonic equipment can produce an image of an unborn baby on a screen. Ultrasound can also aid in the diagnosis of tumours, gallstones, heart disease, and other disorders. Most doctors believe that ultrasonic examinations have no dangerous side effects.

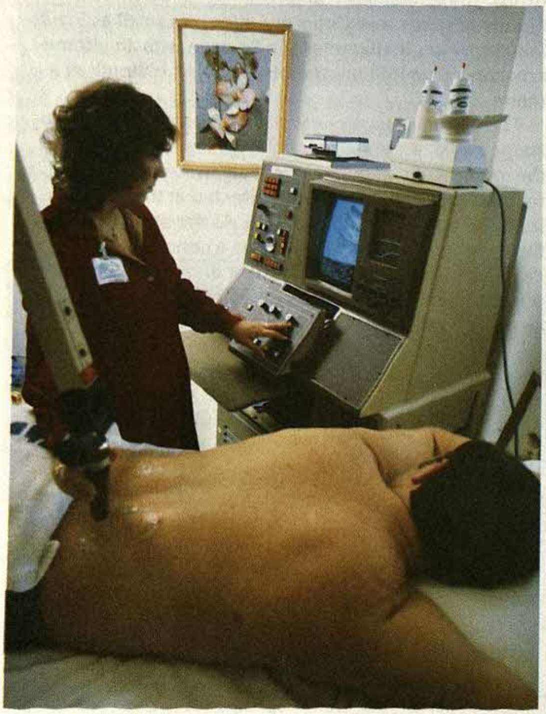
Manufacturers use ultrasound to measure the wall thickness of metal or plastic pipes and to test the concentration of particles in inks and paints. Sonar devices locate enemy ships, schools of fish, and underwater obstacles through the use of ultrasound (see **Sonar**).

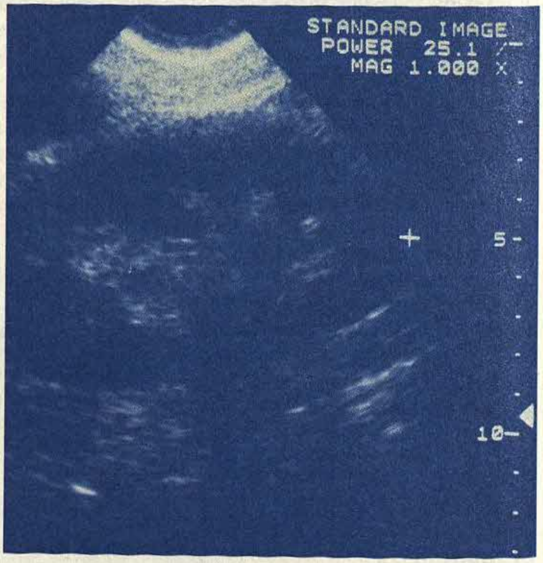
Active uses of ultrasound include those in which it is used to produce certain effects in materials. For example, ultrasound can destroy brain tumours and kidney stones. Ultrasonic waves can be used to clean watches and other delicate instruments and to mix chemicals. At some frequencies, ultrasound can produce enough energy to weld certain metals.

See also **Remote control** (diagram); **Machine tool** (Other advanced machining operations); **Transducer.**

Ultraviolet rays are an invisible form of light. They lie just beyond the violet end of the visible spectrum. The sun is the major natural source of ultraviolet rays. Lightning, or any other electrical spark in the air, also emits ultraviolet rays. The rays can be produced artificially by passing an electric current through a gas or vapour, such as mercury vapour. Ultraviolet rays can cause sunburn. Overexposure to these rays can cause skin cancer. Ultraviolet rays also destroy harmful organisms and have other useful effects.

Ultraviolet rays have shorter wavelengths than visible light has. A wavelength, the distance between the crests of two waves, is often measured in units called *nanometres.* One nanometre (nm) equals 0.000001 millimetre.





Ultrasound is widely used in the diagnosis of heart disease, kidney disease, and other disorders. On the left, an ultrasonic transducer gives off ultrasonic waves and changes the returning echoes into electric pulses. A computer transforms such data as the direction of the echoes and the intensity of the pulses into an image of the patient's kidneys, as shown above.

Wavelengths of visible light range from about 400 to 700 nm. Ultraviolet wavelengths range from about 1 to 400 nm. See **Electromagnetic waves** (diagram: The electromagnetic spectrum).

The wavelength of ultraviolet rays determines whether a material they shine on absorbs the rays or transmits them. For example, only ultraviolet rays with large wavelengths can pass through ordinary window glass. The glass absorbs rays with shorter wavelengths, though they can pass through other materials.

Uses of ultraviolet rays. Ultraviolet rays with wavelengths shorter than 300 nm are effective in killing bacteria and viruses. Hospitals use germicidal lamps that produce these short rays to sterilize surgical instruments, water, and the air in operating rooms. Many food and drug companies use germicidal lamps to disinfect various types of products and their containers.

Direct exposure to ultraviolet rays with wavelengths shorter than 320 nm produces vitamin D in the body. Doctors once used sun lamps that produced these rays to prevent and treat rickets, a bone disease caused by the lack of vitamin D. The lamps are used today to treat some skin disorders, such as acne and psoriasis.

Some instruments use ultraviolet rays to identify the chemical composition of unknown materials. Medical researchers use such instruments to analyse substances in the human body, including amino acids, enzymes, and other proteins. The electronics industry uses ultraviolet rays in manufacturing integrated circuits.

Harmful effects. The sun's shortest ultraviolet rays—those with wavelengths below about 320 nm—are particularly harmful to living things. Too much exposure to these rays can cause painful eye irritation or eye inflammation. High-quality sunglasses protect the eyes from these rays. Overexposure to ultraviolet rays also can cause a painful burn. *Melanin,* a brown pigment in the skin, provides some protection against sunburn. Sunscreen lotions absorb the sun's burning rays.

Exposure to the sun's ultraviolet rays over a long period can cause skin cancer and other changes in human cells. Such exposure also can damage or kill plants. *Ozone,* a form of oxygen in the earth's upper atmosphere, absorbs most of the sun's ultraviolet radiation. Without the ozone layer, ultraviolet rays would probably destroy most plant and animal life. See **Ozone.**

Scientific research. Ultraviolet rays originate within the atoms of all elements. Scientists learn about the makeup and energy levels of atoms by studying the rays. Experts also learn about distant stars and galaxies by analysing the ultraviolet rays that they give off.

Much research has focused on the role of ultraviolet rays in chemical reactions that break down the earth's protective ozone layer. As the ozone layer breaks down, it becomes less effective as a barrier against harmful ultraviolet rays.

Experiments indicate that bees, butterflies, and other insects can see ultraviolet light. The reflection of ultraviolet rays off wings reveals patterns that help insects identify mates.

See also **Telescope** (Other telescopes).

Ulysses was king of Ithaca and a brave and cunning hero in Greek mythology. His name is *Odysseus* in Greek and *Ulysses* in Latin. Ulysses was especially noted for his cleverness. In early Greek writings, he also was generous and noble. Some later Greek writers portrayed him as a sly, deceitful trickster.

Most of the stories about Ulysses tell about his life during and after the Trojan War, a conflict between Greece and the city of Troy. Ulysses is a major character in the *Iliad* and the hero of the *Odyssey,* the two great epics attributed to the Greek poet Homer. The *Iliad* deals with events that occurred in the last year of the Trojan War. The *Odyssey* describes Ulysses' adventures as he returns home after the Trojan War.

The Trojan War. Ulysses was the son of Laertes, the king of Ithaca, and Anticleia. But just before her marriage to Laertes, Anticleia had been seduced by Sisyphus, the king of Corinth. Some Greeks believed that Sisyphus was Ulysses' father.

Ulysses married Penelope, the daugther of Icarius, the king of Sparta. Soon after the birth of their son, Telemachus, a group of Greek leaders tried to recruit Ulysses to fight Troy. But Ulysses did not want to go to war. To avoid joining the army, Ulysses pretended to be insane. He yoked an ox and a donkey to a plough and then sowed his fields with salt. Palamedes, a member of the group, suspected that Ulysses was faking insanity. Palamedes took Telemachus and put him in the path of Ulysses' plough. Ulysses turned the plough aside to protect the baby and thus proved that he was sane.

Ulysses reluctantly agreed to sail with the Greek army for Troy, but he never forgave Palamedes. After the Greeks arrived at Troy, Ulysses tricked them into believing that Palamedes was a traitor. The Greek soldiers then killed Palamedes.

During the Trojan War, Ulysses was a valiant fighter and a wise counsellor to the Greek leaders. Ulysses showed his bravery by going on dangerous missions to spy on the Trojan forces. The Greeks honoured him by giving him the armour of Achilles, the greatest Greek warrior, after Achilles' death.

Return to Ithaca. The Greeks finally defeated the Trojans after 10 years of fighting, and Ulysses set sail for Ithaca. During his return voyage, he visited the land of *Cyclopes* (one-eyed giants). Ulysses was captured by Polyphemus, a Cyclops, but he escaped after blinding the Cyclops with a heated stake. Polyphemus prayed for revenge to his father, the sea god Poseidon. Poseidon then tried to make Ulysses' return home as difficult as possible. With some help from the goddess Athena, Ulysses finally reached home after 10 years of wandering and many thrilling adventures. For the story of his travels, see **Odyssey.**

During Ulysses' long absence, several noblemen had moved into his palace. The men claimed that Ulysses must have died, and they demanded that Penelope marry one of them. Penelope finally agreed to marry the man who could string Ulysses' huge bow and shoot an arrow through 12 axes.

Ulysses arrived at the palace the day before the archery contest, disguised as a beggar. Penelope allowed him to enter the contest. He was the only one who could perform the feat. After revealing his identity, he killed the noblemen with the help of Athena, Telemachus, and some loyal servants. Ulysses then was reunited with his wife.

See also **Cyclops; Greek literature** (Epic poetry); **Homer; Penelope; Trojan War.**

Umar Ibn al-Khattab. See **Muslims** (The first caliphs).

Umber is a brown mineral pigment used to make certain oil and watercolour paints. It is ground, washed, and dried to make *raw umber.* When raw umber is heated, it becomes *burnt umber,* which has a deep reddish colour. The name comes from Umbria, Italy, where the mineral was first found.

Umbilical cord is a ropelike structure that connects the *fetus* (unborn child) to the *placenta* (see **Embryo** [Human development]). The cord contains two arteries and one vein. The arteries carry blood containing waste products from the fetus to the placenta. The vein carries blood containing oxygen and food substances obtained from the mother's blood back to the fetus. When the baby is born, the doctor carefully cuts the umbilical cord about 5 centimetres from the baby's abdomen. The baby's lungs, liver, and other organs then take over the functions performed by the placenta and the mother. The remaining stump of the umbilical cord falls off naturally within 7 to 10 days, leaving the navel, also called the *umbilicus,* which remains throughout life. See also **Childbirth.**

Umbra. See **Penumbra; Shadow; Sunspot.**

Umbrella is a device that protects people from rain and sun. It consists of a circular piece of fabric stretched on a frame attached to a central handle. The frame can be folded when it is not needed.

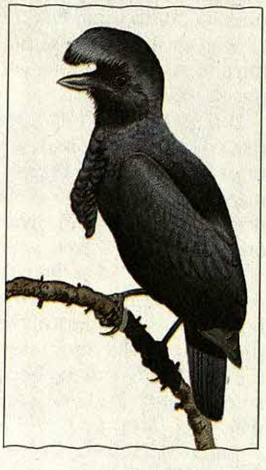
Umbrellas were originally used as sunshades. In many cultures, they were a symbol of rank. In ancient Egypt and Babylonia, for example, only royalty and nobility were permitted to have umbrellas.

Umbrellas were first widely used against rain during the 1700's, when heavy umbrellas made of wood and oilcloth became common in Europe. During the 1800's, light, decorative sunshades called *parasols* became fashionable among women throughout Europe and the United States. Many of these umbrellas had whalebone or metal frames and silk coverings edged with lace and fringe. They remained popular until about the 1920's.

Today, umbrellas are used chiefly as protection against rain or snow. Most umbrellas are made with metal or plastic frames and covered with plain or patterned fabric or clear plastic. They come in a wide variety of colours. Many umbrellas fold up to fit in handbags and briefcases.

Umbrella tree. See **Magnolia.**

Umbrellabird is the name of three species of birds that live in the tropical forests of Central and South America. Male umbrellabirds have an umbrellalike crest of feathers that spread over the head. Males also have a growth of skin, called a *wattle,* that hangs down from the neck. In two of the species, the wattle is covered with feathers. Male umbrellabirds display the crest and wattle to attract a mate. Both the crest and the wattle are relatively undeveloped in females. An umbrellabird is about the size of a crow and has black feathers.


Umbrellabird

Scientific classification. Umbrellabirds belong to the cotinga family, Cotingidae. They form the genus *Cephalopterus.*

Umfolozi is a national park in northern Natal in South Africa. The park lies 270 kilometres north of Durban, and covers 48,000 hectares. Umfolozi is a popular tourist attraction. It is best known for its population of more than 1,000 white rhinoceroses and for the efforts to save the animal from extinction. Other animals in the park include baboon, giraffe, gnu, impala, kudu, leopard, lion, nyala, wart hog, and zebra. Birdlife, reptiles, and fish also abound in Umfolozi.

The park was proclaimed in 1896. It is one of South Africa's oldest game reserves.

Umfolozi gets its name from the Black and White Mfolozi rivers. *Mfolozi* means *zig-zag, river of fibre* or *the erratic one.* It describes the winding course of the rivers.

Umiak. See **Eskimo** (Transportation).

UN. See **United Nations.**

Unamuno, Miguel de (1864-1936), was a Spanish philosophical essayist, poet, novelist, and dramatist. The leading humanist of modern Spain, he argued that the individual—not civilization, society, or culture—was "the subject and supreme object of all thought."

Unamuno's best-known work, *The Tragic Sense of Life* (1913), examines the conflict between faith and reason from the Renaissance to the 1900's. In this book, the author evaluates the significance of will, the desire for immortality, and the search for love in human history. Unamuno's study of Spanish culture in *Concerning Traditionalism* (1895) helped stimulate the Spanish intellectual revival known as the Generation of 1898. His finest poem is the long meditation called *The Christ of Velázquez* (1920). His best novel, *Mist* (1914), examines the mysteries of human existence.

Miguel de Unamuno y Jugo was born in Bilbao. He was appointed professor of Greek at the University of Salamanca in 1891 and rector of the university in 1900. In addition to his many books, Unamuno wrote more than 3,000 short essays and articles. A bold political critic, he incurred the hostility of four successive Spanish governments.

Uncle Remus. See **Harris, Joel Chandler.**

Uncle Sam is a figure that symbolizes the United States. The term originated as an unfriendly nickname for the United States government during the War of 1812 between Great Britain and the United States.

The term "Uncle Sam" was used as early as 1813. In that year, a Troy, New York, newspaper stated that it apparently had arisen because of the initials "U.S." on government wagons. In 1816, the nickname appeared in a book title, *The Adventures of Uncle Sam.* It was later asserted that the term had its origin in a specific person—Samuel "Uncle Sam" Wilson of Troy, New York, who supplied the army with "U.S."-stamped barrels of provisions.

The costume of Uncle Sam, decorated with stars and stripes, originated in the cartoons of the 1830's and the 1840's. However, the figure did not assume its present form until after the American Civil War (1861-1865). In

22.6.2010
14031

Uncle Sam was used in this poster to urge men to enlist in the U.S. Army during World War I (1914-1918). The poster was painted by James Montgomery Flagg.

1961, the United States passed a resolution saluting Samuel Wilson as the original of America's national symbol.

Uncle Tom's Cabin is a famous antislavery novel by the American author Harriet Beecher Stowe. It first appeared as a serial in the abolitionist magazine *National Era* in 1851 and 1852. The novel was published as a book later in 1852 and quickly became a best seller in the United States and Great Britain.

Stowe wrote *Uncle Tom's Cabin* to criticize slavery, which she considered an American national sin. She hoped that her novel would help bring slavery to an early and peaceful end. However, the book increased the hostility of many Northerners toward the South. Southerners, on the other hand, considered Stowe's description of slavery inaccurate. They called the book an insult and an injustice to their region. Historians believe that the bitter feelings aroused by Stowe's book helped cause the American Civil War (1861-1865).

The chief character in *Uncle Tom's Cabin* is Uncle Tom, a dignified old black slave. The story describes Tom's experiences with three slaveholders. Two of them—George Shelby and Augustine St. Clare—treat Tom kindly. But the third, Simon Legree, abuses Tom and has him brutally beaten for refusing to tell where two escaped slaves are hiding. Tom dies from the beating. A subplot of the novel tells about the family of slaves—George and Eliza and their baby—who flee to freedom in Canada. In one famous episode, Eliza, clutching her baby, escapes across the frozen Ohio River from pursuing slave catchers. Two other characters in the book are Topsy, a mischievous black girl, and Little Eva, St. Clare's young daughter. The death of Little Eva is another famous episode.

The novel presents a realistic account of American life 10 years before the Civil War. Stowe created a vivid picture of Southern life, with Tom being sold from one slaveowner to another. *Uncle Tom's Cabin* also describes the upper Midwest of the United States as seen by George and Eliza as they flee northward into Canada.

After the Civil War, *Uncle Tom's Cabin* became known chiefly through abridgements of the novel and by plays based on the book. However, these versions distorted the original story and characters. By the late 1800's, most people believed that *Uncle Tom's Cabin* dealt chiefly with the death of Tom and Little Eva, Topsy's antics, and Eliza's escape. The term "Uncle Tom" came to stand for a black man who, for selfish reasons or through fear, adopts a humble manner to gain favour with whites. But the novel portrayed Tom as a brave man who dies rather than betray two fellow slaves. Few people realized that Simon Legree, the cruel villain, was a Northerner, and that Augustine St. Clare, a Southerner, recognized the evils of slavery.

The famous American critic Edmund Wilson wrote that reading *Uncle Tom's Cabin* for the first time may be a "startling experience." He stated that "it is a much more remarkable book than one had ever been allowed to suspect."

See also **Stowe, Harriet Beecher; American literature** (Abolition and *Uncle Tom*).

Unconscious, in psychology, is a term used to describe such mental processes as thoughts, ideas, and feelings that go on in people's minds without their being aware of them. Many people commonly refer to the *unconscious* as the *subconscious.* The existence of mental processes that are active in the mind without being conscious was first studied scientifically by the French neurologist Jean Martin Charcot and his pupils in the 1800's. They studied the unconscious by means of hypnosis (see **Hypnotism**). Soon after, doctors realized many mentally ill people, such as those with hysteria, were influenced by unconscious thoughts and feelings (see **Hysteria; Mental illness**).

The doctor who first realized clearly the importance of unconscious thoughts and feelings in human psychology was Sigmund Freud of Austria. He developed the method of *psychoanalysis* for treating mentally ill patients (see **Psychoanalysis**). This method also serves as a way of learning what goes on unconsciously in a patient's mind. By using psychoanalysis, Freud was able to prove that unconscious thoughts and feelings not only produce the symptoms of many types of mental illness, but that they are also of basic importance in the way the minds of normal people work. This knowledge has enabled doctors to make great advances in the treatment of the mentally ill.

Related articles in ***World Book*** include:

Freud, Sigmund
Jung, Carl G.
Neurosis
Phobia
Psychotherapy
Subliminal

Unconsciousness. See **First aid** (Fainting).

Unction. See **Anointing of the sick.**

Underdeveloped country. See **Developing country.**

Underground, in political terms, is a secretly conducted movement to overthrow the government or the military occupation forces of a country. Underground tactics have been used since early history, but reached a high point of activity during World War II (1939-1945). Since then, Communist organizations have worked underground in attempts to overthrow many governments.

Adolf Hitler used an underground group called the

London's underground railway, opened in 1863, is the oldest in the world. It is commonly called *the tube.* Much of the railway runs through semicircular tunnels.

Washington, D.C.'s, modern underground railway extends throughout the city and into the suburbs. Thousands of people travel on the underground system each day.

fifth column, especially in the early stages of World War II (see **Fifth column**). German agents worked inside various countries before and during the German invasions of those countries. The agents used espionage, propaganda, and sabotage to aid the German cause and destroy the invaded country's morale.

But once the Germans had conquered a country, the underground of that country's patriots hampered German operations. Underground workers sprang up in France, Belgium, the Netherlands, Denmark, Norway, Yugoslavia, occupied areas of the Soviet Union, and other conquered areas. They plagued the Germans by blowing up railway trains and bridges, sabotaging factories, distributing illegal newspapers, rescuing marooned Allied servicemen, and gathering valuable military information.

See also **Guerrilla warfare; Maquis; Partisans; World War II** (Resistance groups).

Underground railway is a form of transportation designed to move large numbers of people quickly to their destinations. Undergound railways are most efficient in crowded urban areas where heavy traffic often slows down travel by bus or car. Underground railways have also been used to transport goods, but the spreading out of industry and the growing use of trucks have brought an end to this use in most cities.

There are three types of underground railways. One is called the *open cut.* The construction team tears out the streets, and builds the railways in deep ditches. If two lines are going to cross, the workers dig one roadbed deeper than the other. If the construction team lays a pavement or other type of cover over the cut in the ground, the underground railway is called a *cut and cover* railway. The third form of underground railway, called a *tube,* is constructed by boring through the earth at the desired depth without disturbing the surface. This type of construction is for one or two tracks. The tunnels of an open-cut underground have a rectangular shape. The tunnels of a tube railway are usually circular or semicircular. New York City's underground is mainly rectangular. Much of London's underground is semicircular.

Underground railways must be built so that ventilation is good. Stale air is carried off through vents. Fresh air may be brought into the system by means of fans. Trains also act as "pistons" in tubes, moving large amounts of air in the tunnels.

History. London was the first city to have an underground railway. The city's first underground line was operated by steam locomotives and opened in 1863. The first deep-level tube, also in London, opened in 1890, and had electric locomotives. All new underground railways since that time have been operated by electricity. The Paris *Métro* opened in 1900. Some of its trains have *pneumatic* (air-filled) tyres. Many other cities in Europe have underground railways, including Amsterdam, Barcelona, Berlin, Budapest, Glasgow, Hamburg, Lisbon, Madrid, Milan, Oslo, Rome, Rotterdam, Stockholm, and Vienna.

In North America, underground railways are called *subways.* North American cities with subways include Boston, Chicago, Montreal, Philadelphia, San Francisco, and Washington, D.C. Boston's subway, which opened in 1897, was the first in North America. In South America, Buenos Aires has an underground railway built in 1913.

In Australia, Sydney's underground railway loop opened in 1926, and Melbourne's in 1984. The first section of Singapore's underground system started services in 1989. In Japan, Tokyo's system opened in 1927, and Japan now has underground railways in several other cities. India's first underground railway, in Calcutta, opened in 1984. The Cairo metro, the first in Africa, started working in 1987.

See also **Electric railway; Tunnel.**

Undertaker. See **Funeral director.**

Underweight. See **Weight control.**

Underworld. See **Crime.**

Underwriting is a term first used in England in the 1600's. *Underwriters* (insurers) wrote their names at the bottom of proposed insurance contracts covering a ship and its cargo. They indicated in this way their willingness to assume part of the risk.

Today, every insurance company has an underwriting department which is important to the success of the firm. Underwriting experts must determine the premium rates for various kinds of policies and the amount and degree of risk to be assumed for each policy.

Underwriters also examine all applications for insurance in order to guard against bad risks and to prevent the company from assuming too many of the same kinds of risks. For example, a fire insurance underwriter may find that several suspicious fires have occurred in the building to be insured. On the basis of this finding, the underwriter may decide the risk is bad.

In finance, the term *underwriting* has another meaning. It is an agreement to purchase a company share or bond issue.

See also **Insurance; Lloyd's.**

Undset, Sigrid (1882-1949), a Norwegian author, won the 1928 Nobel Prize for literature. *Kristin Lavransdatter* (1920-1922), her major work, is an epic trilogy of life in Norway during the Middle Ages. It consists of the novels *The Bridal Wreath, The Mistress of Husaby,* and *The Cross.* The novels tell the story of Kristin—her childhood, stormy marriage, and dedication to Christian service after the death of her husband. The displacement of heathen customs by Christian ideals in medieval Norway is dealt with in a second but less impressive epic, *The Master of Hestviken* (1925-1927). The series consists of *The Axe, The Snake Pit, In the Wilderness,* and *The Son Avenger.*

Undset was born in Kalundborg, Denmark. She was the daughter of Ingvald Undset, a distinguished Norwegian archaeologist. Her father awakened in her a strong interest in the Middle Ages. After he died, Undset gave up plans for a career as a painter and went to work in an Oslo business office. While working there from 1899 to 1909, she gathered impressions which she used in her early realistic stories of lower-middle class life.

Jenny (1911), her first novel to attract widespread attention, deals with the sexual problems of a female artist. Undset wrote other novels about life in her time. They include *The Wild Orchid* (1929) and *The Burning Bush* (1930), stories of a man's conversion to Roman Catholicism. They reflect Undset's own conversion to Catholicism in 1924. Undset lived in the United States from 1940 to 1945, while the Nazis occupied Norway.

Undulant fever. See **Brucellosis.**

Unemployment is the state of a person who is out of work, and actively looking for a job. The term unemployed does not refer to people who are not seeking work because of old age, illness, or a mental or physical disability. Nor does it refer to people who are attending school or keeping house. Such people are generally classified as being "out of the labour force."

Unemployment may involve serious problems for an individual, and for society as a whole. For the individual, it means loss of income, and prolonged unemployment may result in a loss of self-respect. For society, unemployment can lead to lost production, and, in some cases, to criminal or other antisocial behaviour.

Normal unemployment exists in efficiently operating labour markets, even when jobs are plentiful. Such unemployment includes workers who have left their jobs or have been fired and have not yet started a new job. It includes other individuals, such as young people and former homemakers, who have not recently been employed but are now seeking a job. This is called *short-term* unemployment.

Another kind of normal unemployment, called *seasonal* unemployment, occurs in industries that lay off workers during certain seasons each year. Such industries include agriculture, construction, and shipping. For example, because Canada has long, cold winters, seasonal unemployment there is a much more serious problem than it is in many warmer countries.

Structural unemployment exists when individuals seeking work have the wrong skills for the available jobs. For example, construction labourers may be seeking work at a time when there is a shortage of secretaries and computer programmers. Structural unemployment also includes people who live in areas where jobs are scarce, while jobs are plentiful elsewhere.

Structural unemployment includes *technological* unemployment. This results from the development of new products, machinery, or manufacturing methods. Such developments call for new skills from workers. The total number of employment opportunities may not fall, but the number of jobs in certain occupations may grow less rapidly than in others or may even decline.

Deficient demand unemployment results from a general lack of demand for workers. This happens when a nation's total spending is too little. When goods and services remain unsold, many industries reduce production, and lay off employees. Alternatively, industries can attempt to maintain production and employment levels by reducing both prices and wages.

Deficient demand unemployment is called *cyclical unemployment* when it occurs in periods of decreased business activity. But it also can occur in times of increasing activity if the number of workers grows faster than the number of jobs.

In the 1930's, during an economic slump known as the Great Depression, unemployment increased rapidly in many countries. In Canada, Germany, and the United Kingdom, for example, unemployed people accounted for about 13 to 20 per cent of the labour force. In the United States, 25 per cent of people who wanted work could not find jobs in the early 1930's. The American unemployment rate remained above 14 per cent until 1940. After the United States entered World War II in 1941, and its government spent huge amounts of money for military purposes, the unemployment rate dropped. It was only 1.2 per cent by 1944.

Unemployment statistics. Economists disagree on the meaning of *unemployment rate,* the statistic showing the proportion of people who are unemployed. Some believe the rate exaggerates the problem because it includes some people who want only part-time jobs, and also some who are not making serious efforts to find a job. Others argue that the rate underestimates the problem because it does not include discouraged workers who have stopped looking for jobs, or workers who have taken jobs below their skill level.

Economists point out that countries use different ways to count the unemployed. Also, a single unemployment statistic for a country does not reveal how much unemployment may vary among different groups of people. For example, unemployment rates tend to be higher for younger people than for older people. Unskilled labourers experience much more unemployment than do skilled workers and white-collar employees. Some groups of people suffer employment discrimination because of their race, religion, language, national origin, or other characteristics.

Full employment. In 1941, a proposal in the UK, the Beveridge Plan, called for a policy of *full employment.* Full employment means that jobs are available for anyone who wants to work. Under this policy, when business and industry cannot provide enough jobs, the government must take action to create jobs. Many industrial countries have had such a policy. It found little support in the United States, or other countries where governments favoured a *free-market* economy.

Full employment policies aim at unemployment rates as low as 3 to 4 per cent, so that the only unemployment is structural or short-term. Some economists argue that higher unemployment rates might be necessary to hold *inflation* (rising prices) in check.

Insurance schemes. Unemployment insurance is a means of providing income support for workers who are out of work and looking for employment. The unemployed workers receive cash payments, usually each week for a limited period. Most industrial countries have unemployment insurance systems.

The first known unemployment insurance plan was adopted in Basel, Switzerland, in 1789. Afterward, several trade unions in the United States and Europe adopted voluntary plans. Such plans helped able-bodied wage-earners who were temporarily out of work through no fault of their own.

In 1911, the UK set up the first compulsory unemployment insurance system. After World War I (1914-1918), the UK system began paying various types of allowances, commonly called the *dole,* to unemployed workers. About 40 countries, mostly in Europe, North America, and Australia, have similar schemes.

World summary. World employment and unemployment statistics are reported regularly by the International Labour Office of the International Labour Organization. Low unemployment rates have been maintained in some countries. Sweden had under 2 per cent employment in the late 1980's, and Japan's rate was under 3 per cent. Labour shortages in Japan and in Singapore (under 5 per cent unemployment) helped these countries to hold down unemployment. In the United States, a recession in the early 1980's caused a sharp rise to 10.8 per cent, the highest since 1941. The U.S. rate remained near 5 per cent in the late 1980's.

Countries which had rates between about 5 and 10 per cent in the late 1980's included Australia, Canada, Israel, the Philippines, South Africa, and the United Kingdom. Malaysia had an unemployment rate of 8 per cent, but the country enjoyed a surge in prosperity.

Nations with rates higher than 10 per cent in the late 1980's included India and Ireland. Ireland's rate was more than 17 per cent, and a large number of people decided to leave the country and seek work elsewhere.

By the end of the 1980's, the unemployment rate among the 24 countries of the OECD (Organization for Economic Cooperation and Development), in Western Europe, North America, and the Pacific area, was about 7 per cent. This was the same level the countries experienced at the start of the 1980's.

See **Poverty; Social welfare.** See also sections on economy and on social welfare in *World Book* articles on countries.

UNESCO is a specialized agency of the United Nations (UN). Its full name is United Nations Educational, Scientific and Cultural Organization. Countries that belong to UNESCO agree to contribute to peace and security by cooperating in the areas of education, science, and culture. About 160 nations, including almost all UN members, belong to UNESCO. Nations that belong to UNESCO provide most of the agency's funds. UNESCO was founded in 1946 and has headquarters in Paris.

UNESCO seeks to increase respect for justice, law, human rights, and fundamental freedoms for all people. The agency carries out programmes to promote these aims only at the request of its members. Many agency decisions can be carried out only if the governments of member nations take action in their own countries.

UNESCO tries to increase the flow of ideas among the peoples of the world. It stresses the development and quality of education, the sharing of cultures, and the increase and peaceful use of scientific knowledge. The organization encourages artists, scientists, students, and teachers to travel, study, and work in other countries. It focuses on the use of the social sciences to help solve such problems as discrimination and violence. UNESCO stimulates scientific research on such issues as energy use and environmental protection. It works with other UN agencies to help developing countries.

About 500 private international associations called *nongovernmental organizations* (NGO's) consult with UNESCO. The NGO's help plan and carry out programmes in which they take a special interest.

What UNESCO does

Education. UNESCO considers learning important for economic development and for peace. It helps countries in their efforts to improve education at all levels. The agency sponsors programmes to train teachers, build courses of study, and carry out research in education. UNESCO has started literacy programmes. It also sponsors permanent and mobile libraries.

Science. UNESCO also considers science and technology as important tools for peace and development. The agency promotes international scientific cooperation and encourages basic scientific research and the application of scientific findings. UNESCO distributes scientific information, sponsors training courses, and organizes science conferences and seminars. It operates scientific centres in Africa, Asia, and Latin America. It helped establish the European Organization for Nuclear Research (CERN), which performs research on the peaceful uses of nuclear energy.

UNESCO contributes to the growth of knowledge in the social sciences by sponsoring research and teaching programmes. It promotes the application of the social sciences to solving practical problems. Among its social science concerns are race relations, economic development, and the status of women.

Culture. UNESCO encourages international cooperation to protect different cultures and to develop and share an appreciation of them. The agency advises governments on how to restore and preserve national monuments. It sponsors exhibitions and other efforts to acquaint the public with works of art, literature, and music. It promotes international copyright agreements.

Organization members stress the rights to inform and to be informed. UNESCO has programmes in all major areas of mass communication—including books, films, newspapers, radio, and television. It provides technical aid to developing nations for communications systems.

How UNESCO is organized

The General Conference of UNESCO consists of delegates appointed by the member nations. It meets every two years. The conference decides on UNESCO policies and programmes. It approves the budget and passes staff regulations. The conference selects the Executive Board and appoints the director-general of UNESCO. It admits new members to UNESCO and prepares conventions and recommendations for approval by the member nations. General Conference delegates have met in several major cities of the world, but most meetings take place in Paris.

The Executive Board has 51 members. They are elected to four-year terms and may be reelected. The board meets in regular session at least twice a year. It supervises work on UNESCO programmes and prepares the agenda for the General Conference. The board also recommends new member nations and nominates the director-general.

The Secretariat administers UNESCO's programmes. People from most member nations work in the Secretariat. They include administrators, general service personnel, and various kinds of specialists. Some of them work at UNESCO headquarters, and others work in the field.

The director-general, the chief administrative officer of UNESCO, appoints and directs the Secretariat. This executive officer also makes regular reports on UNESCO activities to member nations and the Executive Board, and submits work plans and budget estimates to the board. The director-general is elected to a six-year term and may be reelected.

The national commissions of the member nations advise their governments. They also assist the delegations to the General Conference. Most commission members come from national organizations interested in education, science, and culture.

History

After World War I (1914-1918), most of the Allies joined in an international organization called the League of Nations (see **League of Nations**). The League recognized the importance of promoting intellectual cooperation among the nations of the world. It supported the International Institute of Intellectual Cooperation, an association of individuals located in Paris. This group and the International Bureau of Education in Geneva, Switzerland, later served as models for UNESCO. Also, during World War II (1939-1945), the Conference of Allied Ministers of Education met regularly in London. These officials were especially concerned with reviving educational systems that had been weakened or destroyed by the war.

The United Nations Charter was signed in San Francisco, in the United States, during June 1945. In November of that year, the United Nations Conference for the Establishment of an Educational and Cultural Organization met in London. Scientists convinced the planners to add a reference to science in the title of the proposed agency. Government representatives of 44 nations drew up the Constitution of UNESCO, and UNESCO officially came into existence on Nov. 4, 1946. By that date, 20 governments had *ratified* (approved) the Constitution.

As UNESCO has grown, it has become increasingly difficult for its members to agree on priorities. New members—especially newly independent states—have had new ideas about how UNESCO should use its resources. Both decisions and decision-making procedures have become more controversial. As a result, UNESCO has not always received the support it needs to accomplish its goals.

Four nations have withdrawn from UNESCO since its founding. In 1956, South Africa left when its government accused UNESCO of interfering in the country's racial problems. The United States withdrew in 1984 and Great Britain in 1985 because of what their governments viewed as UNESCO's anti-Western bias, its efforts to restrict press freedom, and its wasteful management methods. Singapore left UNESCO in 1985 because its government felt that the country was expected to contribute too much to the UNESCO budget.

See also **Huxley** (Sir Julian Sorell Huxley); **Library** (International library programmes); **United Nations.**

Uneven parallel bars. See **Gymnastics** (The uneven parallel bars).

Ungulate is any mammal whose toes end in hoofs. The name comes from the Latin word *ungula,* meaning *hoof.* Scientists divide ungulates into two groups. *Odd-toed ungulates* include horses, which have one toe on each foot, and rhinoceroses, with three. *Even-toed ungulates* include deer, with two toes per foot, and pigs, with four. Ungulates are the only horned mammals, but not all ungulates have horns. All ungulates are *herbivores* (animals that eat chiefly plants). Elephants, the largest land animals, are ungulates.

Related articles in ***World Book*** include:

Alpaca
Antelope
Babirussa
Bighorn
Boar, Wild
Buffalo
Camel
Carabao
Caribou
Cashmere goat
Cattle
Deer
Dromedary
Elephant
Giraffe
Goat
Guanaco
Herbivore
Hippopotamus
Hoof
Horn
Horse
Ibex
Karakul
Llama
Musk ox
Okapi
Peccary
Pig
Pronghorn
Rhinoceros
Ruminant
Sheep
Vicuña
Wart hog
Yak

UNICEF is the commonly used name for the United Nations Children's Fund. The name comes from the original title of this UN body—United Nations International Children's Emergency Fund. UNICEF aids children in more than 100 countries by helping to solve problems of health, hunger, and education. UNICEF provides supplies for disease-control programmes, daycare centres, health centres, school food plans, and other projects. It also provides grants to help train people for such jobs as nursing and teaching. In 1965, UNICEF received the Nobel Peace Prize for its work in aid to children.

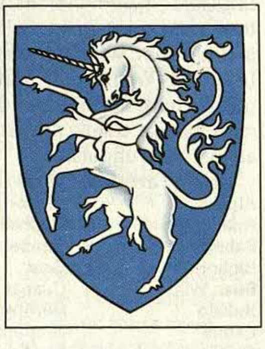
UNICEF programmes aid children in more than 100 countries. This infant is being immunized at a UNICEF centre in Africa.

When UNICEF was created in 1946, it gave food, clothing, blankets, and medicine to the children who needed help after World War II. Following this work, it continued to give aid to children of developing nations.

UNICEF depends entirely on voluntary contributions. Nearly three-fourths of its income comes from various governments. The rest comes from organizations and individuals, through the sale of greeting cards and other fund-raising campaigns.

Unicorn is an imaginary animal that plays a prominent part in medieval European legend and art. The unicorn has the head and body of a horse, the legs of a deer, and the tail of a lion. It is named after the single horn that projects from the middle of its forehead. Unicorns are usually portrayed as white and are generally believed to symbolize purity, chastity, and meekness.

People once believed that the unicorn's horn contained an antidote for poison, and during the Middle Ages, powders supposedly made from such horns sold for extremely high prices. Most scholars believe the image of the unicorn was derived from hearsay European accounts of the rhinoceros.



Unicorn

See also **Animal** (picture); **Tapestry** (picture).

Unicycle is a vehicle with a seat and frame mounted above a single wheel. The rider causes the unicycle to move forward or backward by rotating two pedals with the feet. Unicycles are ridden by children and adults and are used chiefly for recreation. People often juggle objects or perform other stunts while riding unicycles.

Unicycles first appeared in the late 1800's as part of circus acts and similar entertainments. These early models were handcrafted by their riders. In the mid-1900's, several bicycle companies began manufacturing unicycles for sale to the general public. Today, some bicycle shops sell models in standard sizes with seats as high as 1.5 metres above the ground. Unicycles more than 1.5 metres high and speciality unicycles must still be handmade.

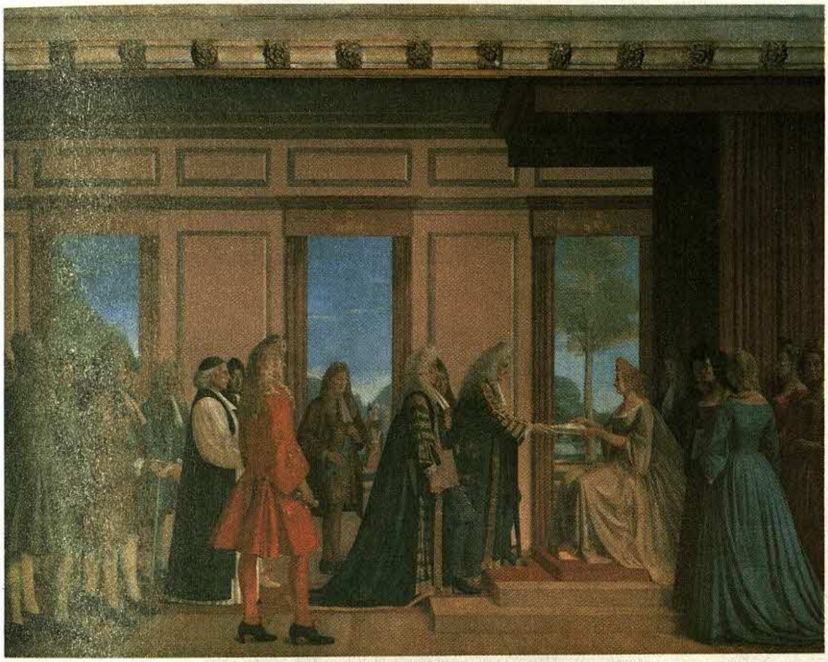
A unicycle, *centre,* has only one wheel and no handlebars. Riders steer with their feet and by shifting their weight.

Unidentified flying object (UFO) is a strange light or object that appears in the sky or near the ground and has no known cause. Some people believe UFO's may be spaceships from other planets. Others think UFO's have natural causes, even though scientists cannot explain all UFO reports. Observers have described various kinds of UFO's. Many of these objects resemble a glowing tube or saucer and fly silently at high speeds, displaying manoeuvres that would be unusual for an aircraft of any kind. UFO's have been reported to have frightened animals, caused static on radios, and landed and left marks on the ground.

For hundreds of years, people have reported seeing mysterious objects in the sky. During World War II (1939-1945), the number of such reports increased greatly. Many military and civilian pilots reported seeing strange moving lights that they called *foo-fighters.* Other reports, some of so-called *flying saucers,* occurred during the mid-1900's in many countries. Many came from reliable observers, some of whom photographed what they saw. Many people believe that UFO's are spaceships of alien beings from other planets.

Scientists have provided logical explanations for most UFO reports. For example, in many cases, a reported UFO later was identified as a meteor, a planet, a rocket, a star, an artificial satellite, or a weather balloon. Aircraft or their exhaust trails, seen under unusual lighting conditions, have also been reported as UFO's. In addition, atmospheric conditions may produce optical illusions that are described as UFO's.

From 1966 to 1968, a major study of UFO's took place in the United States. The U.S. Air Force sponsored the



Act of Union was signed by Queen Anne in 1707. It united the separate parliaments of England and Scotland into one parliament.

Painting by W. T. Monnington in House of Commons, London

study, by scientists at the University of Colorado. The scientists could not explain all the UFO reports, but they found no evidence that UFO's came from other planets. The Air Force also investigated more than 12,000 UFO reports that occurred from 1947 to 1969. It ended the investigation after concluding that UFO's were no threat to national security. In many countries there are organizations that study the UFO phenomenon and publish information on it.

Unification Church. See **Cult.**

Uniform is a style of clothing that identifies people as members of a group or as workers in a particular field. The most renowned uniforms are the military uniforms.

For pictures of uniforms, see **Air force; Army; Navy; Clothing.**

Uniformity, Act of, is any one of several acts of the English Parliament, which were passed in 1549, 1552, 1559, and 1662. These acts set out the form of public prayers and ceremonies to be used in all churches. The most important one, passed in 1662, enforced the use of the revised Book of Common Prayer. It required clergy to be ordained by bishops, and to make certain sworn declarations. Between 1,000 and 2,000 ministers would not conform and were removed from their positions in the Church. The act, amended in 1872, is still in force, but Nonconformists and Roman Catholics gained freedom of worship from the Toleration Act (1689) and later acts.

See also **Prayer Book.**

Union. See **Flag** (table: Flag terms); **Set theory; Trade unions.**

Union, Acts of, brought separate parliaments together into one United Kingdom parliament at Westminster, in London. The first act, concerning the Scottish Parliament, became effective in 1707. The second act concerned Ireland and took effect in 1801.

The Act of Union of 1707 followed a Scottish threat to restore the exiled Stuart family to the throne of Scotland and to establish a separate nation. The English Parliament offered political representation and equality in trading facilities in return for a complete merging of the crowns and parliaments of England and Scotland. Both parliaments passed the Act of Union. Under it, Scotland was to be represented by 16 peers in the House of Lords and 45 members in the House of Commons. Scotland retained its own national Church and laws.

The Act of Union of 1801 was initiated by William Pitt the Younger, the British prime minister. Irish demands for independence had become more urgent after the outbreak of the French Revolution in 1789. Pitt hoped that by uniting the British and Irish parliaments the interests of Ireland would be better represented. He also hoped to pass further laws preventing discrimination against Roman Catholics in Ireland.

As a result of large bribes distributed by Lord Castlereagh, the Irish Parliament passed the Act in 1800. It abolished the separate Irish Parliament, and transferred its powers to the Westminster Parliament, which then governed the whole of Britain and Ireland. The crosses of St. Andrew, patron saint of Scotland, St. George, patron saint of England, and St. Patrick, patron saint of Ireland, were united to make one flag, the Union Flag. But George III opposed legislation that would have benefited the Irish Roman Catholics, and the Act did not settle Irish discontent.

Union, Labour. See **Trade unions.**

Union Jack is the name sometimes used for the national flag of the United Kingdom, officially called the British Union Flag.

See also **Flag** (picture: Historical flags of the world).

Union of South Africa. See **South Africa** (The Union of South Africa).

The rise of the Soviet Union began in the early 1900's. The *Bolsheviks* (later called Communists) overthrew the Russian government in 1917. The Bolshevik leader V. I. Lenin, *above,* headed the new government, which established the Union of Soviet Socialist Republics in 1922.

U.S.S.R.

Union of Soviet Socialist Republics (U.S.S.R.), also called the Soviet Union, was the world's first and most powerful Communist country. It existed from 1922 to 1991. In 1991, the Communist Party lost power, and the Soviet Union broke up into a number of independent states.

From the mid-1940's to the late 1980's, the Soviet Union was one of the two world superpowers. The other was the United States. Intense rivalry between these two countries shaped much of the history of this period.

Before its breakup, the Soviet Union was the largest country in the world in area. It covered more than half of Europe and nearly two-fifths of Asia. The Soviet Union had the third largest population in the world, after China and India.

The Soviet Union was officially created in 1922 when Russia joined with three other territories under the name *Union of Soviet Socialist Republics.* These became the first of the country's 15 *union republics.* The other republics were created and added between 1922 and 1940. The union republics were Armenia, Azerbaijan, Byelorussia (now Belarus), Estonia, Georgia, Kazakhstan, Kirghiz (now Kyrgyzstan), Latvia, Lithuania, Moldavia (now Moldova), Russia, Tadzhikistan (also spelled Tajikistan), Turkmenistan, Ukraine, and Uzbekistan.

Each republic had its own government, but these governments were strictly under the control of the Communist central government. In 1991, the Communists fell from power after a failed attempt by conservative Communist officials to overthrow Soviet President Mikhail Gorbachev. Shortly after the attempted take-over, most of the republics declared their independence. All but Georgia and the three Baltic republics of Estonia, Latvia, and Lithuania formed a loose confederation called the Commonwealth of Independent States. The Soviet Union ceased to exist.

At its height, the Soviet Union was an industrial giant, ranking second after the United States in total production. For years, it led all other countries in space exploration. Its armed forces were the largest in the world, and its nuclear arsenal was second only to that of the United States. However, many Soviet families lived in crowded conditions because there was not enough housing. There were often shortages of meat, shoes, and other goods. The Communist leaders controlled the government, economy, educational system, and communications media. They restricted religious practices and punished those who opposed their policies.

Government

The Communist Party. For almost its entire history, the Soviet Union was dominated by the Communist Party. The Communist Party structure was like a pyramid. At the bottom of the pyramid were about 440,000 local groups called *primary party organizations.* They were set up throughout the U.S.S.R. in such places as factories, farms, government offices, and schools. The primary party organizations, formerly called *cells,* were responsible for local political and economic life. They rewarded party members for productivity at work or for living according to Communist teachings.

Just above the primary party organizations were the district party organizations. The district organizations operated under the regional party organizations, which, in turn, reported to the republic party organizations.

At the top of the Communist Party pyramid were the party congresses, which met periodically—usually every five years. Thousands of delegates from party organizations throughout the country attended these congresses. Each congress elected a Central Committee to handle its work. The Central Committee, in turn, elected a Politburo (Political Bureau) and a Secretariat. In actual practice, the Politburo and the Secretariat selected their own members and those of the Central Committee.

The Politburo was the most powerful body in the Soviet Union. It set all important policies. The Secretariat managed the daily work of the Communist Party. The general secretary, or chairman, of the Central Committee headed the Politburo and the Secretariat and was the most powerful person in the U.S.S.R.

National government. The main body of the official Soviet central government was a two-house federal parliament called the Supreme Soviet of the U.S.S.R. *Soviet* is a Russian word meaning *council.* The two houses were the Soviet of the Union and the Soviet of Nationalities. The members of each house were called *deputies.* The number of deputies to the Soviet of the Union from each republic depended on population. Each republic—and certain other political units within the Soviet Union—sent a fixed number of deputies to the Soviet of Nationalities.

The formal duties of the Supreme Soviet were to write laws and supervise the administration of the government. But for most of the country's history, the parliament met only twice a year for a week or less. It passed without question all proposed laws, which came from the Communist Party's leaders. The chairman of the Supreme Soviet served as head of state, legislative leader, and commander of the armed forces.

The Soviet government included two other important bodies. These were the Presidium of the Supreme Soviet and the Council of Ministers. The members of both bodies were officially elected by the Supreme Soviet. But they were actually chosen by Communist Party leaders. The Presidium handled legislative matters. The Council of Ministers was the highest executive body, with primary responsibility for the economy.

The Committee on State Security, known as the *KGB,* was an agency of the Council of Ministers. It was the government's political police system and had offices and agents throughout the Soviet Union.

Local government. In addition to the union republics, the Soviet Union included various autonomous republics, autonomous regions, and autonomous areas. *Autonomous* means *self-governing,* but the autonomous republics, regions, and areas actually had little control over their own affairs. The political structure of the union republics and the autonomous republics was much like that of the entire country. Each republic was governed by a supreme soviet with a presidium, and a council of ministers. Each one also had its own constitution. The lower levels of local government had soviets of people's deputies.

Armed forces. The armed forces of the U.S.S.R. were the largest in the world. At the time of its breakup, the Soviet Union had a total of about 4 million people in its army, navy, and air force.

People

The population of the Soviet Union consisted of more than 100 ethnic groups. The Soviet republics were set up on the basis of ethnic groups and carried their names. For example, Georgians lived mainly in the Georgian Soviet Socialist Republic (now the independent nation of Georgia), and Armenians were centred in the Armenian Soviet Socialist Republic (now Armenia).

Slavic ethnic groups made up about 70 per cent of the total Soviet population. The Russians, the largest Slavic group, made up about half of the country's population. The Russians lived throughout the country and held a large share of leadership positions in the various governments. The Ukrainians were the second largest Slavic group, and the Belarusians (then called *Byelorussians*) were the third largest. In 1991, the Ukrainians and Belarusians formed independent nations.

Turkic peoples ranked second in number to Slavic peoples in the U.S.S.R. The largest Turkic groups included the Uzbeks, the Kazakhs, the Kyrgyz (then spelled *Kirghiz*) people, and the Turkmens. These four Turkic groups also formed independent nations. Other groups who gained nationhood included the Tajiks (then spelled *Tadzhiks*) and the Moldovans, whom the Soviets called *Moldavians.*

Minority groups in the Soviet Union included Finno-Ugric peoples and Germans. Many small Siberian groups, related to Native Americans of the Far North, made their homes in the Arctic.

Each nationality in the Soviet Union tried to preserve its own language and culture. But Russian was the official language of the U.S.S.R.

Jews, who were listed as a nationality group by the Soviet census, faced widespread discrimination in the Soviet Union. During most of the 1900's, the government discouraged the practice of Judaism and Jewish customs, and it restricted Jewish emigration.

Way of life

Personal freedom. For much of Soviet history, especially during the 1930's, the people lived in fear. The secret police arrested millions of citizens suspected of anti-Communist views or activities. The victims were shot or sent to prison camps. In the late 1980's, the government began to grant the people greater freedom. It allowed criticism of the Soviet system. Also, the works of writers whose views had been officially condemned were permitted to be read openly.

Until 1990, the Communists restricted religious practices. They were officially *atheists* (people who believe there is no God). They looked on religion as an anti-Communist force. Religious worship survived in the Soviet Union, however, and the restrictions gradually decreased.

Privileged classes. The early Communists hoped to achieve a *classless society*—a society with neither rich nor poor people. The government took over all privately owned factories, farms, and other means of production. It abolished income from private property and provided such benefits as free medical and hospital care. The goal, as stated by Karl Marx, the German philosopher whose ideas formed the basis of Communism, was, "From each according to his abilities, to each according to his needs." The Communists failed to achieve a classless society.

City life. By 1990, about two-thirds of the Soviet people lived in urban areas. Cities were crowded, and many families shared small and poorly maintained but cheap apartments.

There were frequent shortages of meat, shoes, soap, and many other goods. Shoppers often had to spend much time looking for what they wanted.

Rural life. Living conditions in the rural areas of the Soviet Union were poorer than in the cities. In rural villages, many families lived in small log huts or in community apartments with no gas, plumbing, or running water, and some did not have electricity. Most people in rural areas traditionally worked on huge government-controlled farms.

Education. During the early 1900's, Russia was largely a country of poor, uneducated peasants. After the Communists seized control, they strongly promoted education. Soviet children had to attend school for 11 years, from the age of 6 to 17. Education was free.

The Soviet Union had many schools for gifted children, who were chosen by examination. These schools, beginning in the first grade, provided extra instruction in the arts, languages, or mathematics and science. The Soviet Union also had about 70 universities and more than 800 technical institutes and other schools of higher education.

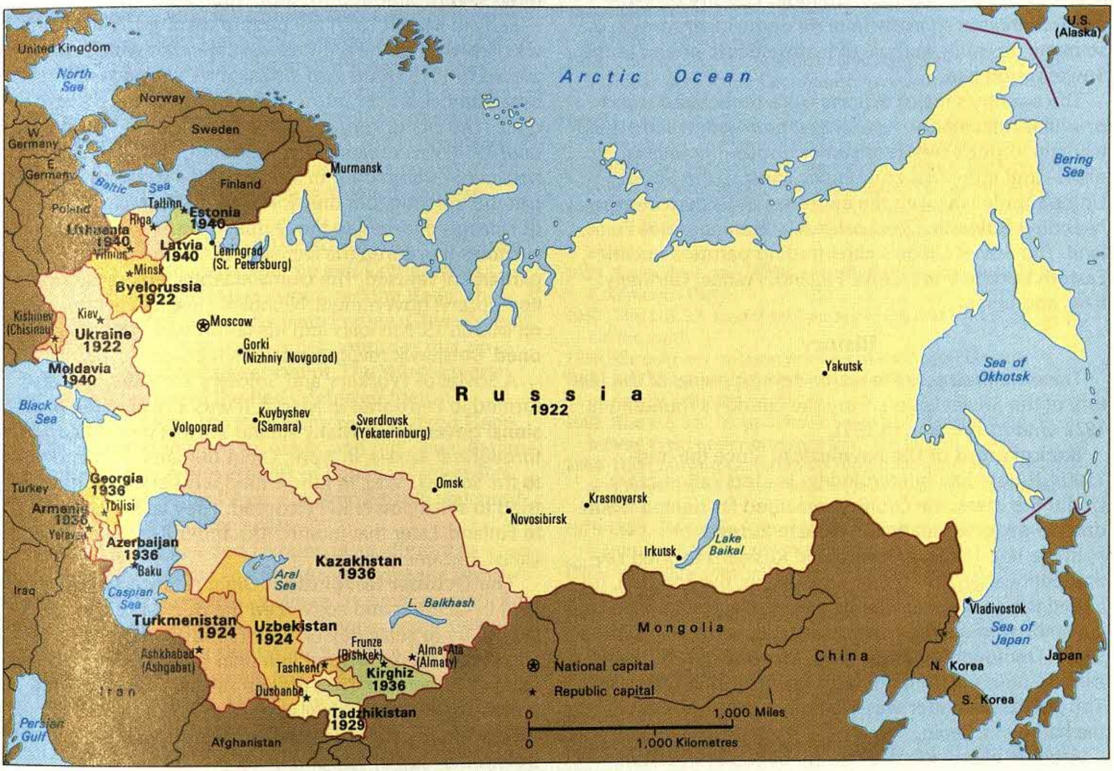
Science and technology. Soviet achievements in science and technology were among the highest in the world. The government established many research institutions and employed hundreds of thousands of scientists, engineers, and technicians. These specialists made it possible for the Soviet Union to become an industrial and military power. Their work enabled the U.S.S.R. to lead the world in space exploration. In 1957, the Soviet Union launched Sputnik 1, the first artificial satellite. In 1961, Soviet air force officer Yuri Gagarin orbited the earth and became the first person to travel in space.

Arts. For most of the history of the Soviet Union, the Communist Party attempted to control all artistic expression. Such writers as Boris Pasternak and Alexander Solzhenitsyn were disciplined for criticizing Communism. In the late 1980's, however, the Soviet government began to allow artists much greater freedom in their work.

Even under the strict controls, a number of Soviet artists made noteworthy achievements. Pasternak and Solzhenitsyn won the Nobel Prize for literature. Director Sergei Eisenstein became famous for his methods of film editing. The music of composers Aram Khachaturian, Sergei Prokofiev, and Dimitri Shostakovich received worldwide attention. The Moscow Art Theatre, founded in 1898, remained the most respected theatre company in the Soviet Union. The Bolshoi Theatre Ballet

The Supreme Soviet was the parliament of the Soviet government. It met twice a year to pass laws proposed by Communist Party leaders.

The republics of the U.S.S.R. The U.S.S.R. covered more than half of Europe and nearly two-fifths of Asia. The map below shows the country's 15 republics and the dates when they became part of the Soviet Union. The country dissolved in 1991. The republics are now independent nations.



and the Kirov Ballet continued to earn international fame for the brilliance of their performers.

Economy

The Soviet Union developed the world's largest centrally planned economy. Until the mid-1980's, the Soviet Union ranked second after the United States in production of goods and services. The government owned the country's banks, factories, land, mines, and transportation systems. It planned and controlled the production, distribution, and pricing of all important goods.

Beginning in 1928, the Soviet economy grew rapidly under a series of plans emphasizing industrialization. But improvements in living conditions lagged behind the growth of the economy. The country's participation in World War II (1939-1945) caused a major economic setback. The standard of living rose rapidly between 1953 and 1975. But it then stopped improving.

In the late 1980's, the Soviet leadership began a major reform of the economy called *perestroika* in an attempt to promote innovation, to increase efficiency, and to respond to consumer wants. In spite of these efforts, economic problems continued until the Soviet Union was dissolved.

Manufacturing. During the 1920's, the U.S.S.R. was mainly a farming country. But under Communism it became an industrial giant. In 1928, the Soviet Communist leaders began the first of a series of *five-year plans* to promote the growth of industry. Each plan set up investment programmes and production goals for a five-year period.

The Soviet government had widespread control over the operation of individual factories. Government agencies told factory managers which products to make, how many items of each to produce, and where to sell them. The government took about three-fifths of the factories' profits in taxes.

Agriculture. The U.S.S.R. had more farmland than any other country. Its farmland covered more than 5.8 million square kilometres, over a quarter of the entire country. The Soviet Union was one of the world's two leading crop-producing countries. The United States was the other.

In the 1980's, about two-thirds of the farmland in the U.S.S.R. consisted of some 22,000 *sovkhozy* (state farms). These huge farms averaged about 17,000 hectares in size. The state farms were operated like government factories, and the farmworkers received wages.

About a third of the farmland in the U.S.S.R. consisted of some 26,000 *kolkhozy* (collective farms), which were controlled by the government but managed in part by the farmers. These farms averaged about 6,500 hectares. In general, a collective farm supported about 500 households. The collective farmers were paid wages and a share of the production and profits. Families on collective farms could farm small plots for themselves and sell their products privately.

Foreign trade played only a small part in the Soviet economy because the country's policy was to be self-sufficient. The Soviet Union's enormous natural resources provided almost all the important raw materials needed by Soviet industry. No other country had so much farmland, so many mineral deposits or forests, or so many possible sources of hydroelectric power as the Soviet Union had.

The country's major exports were timber and wood products, machinery, natural gas, petroleum, and steel. Its main imports were consumer goods—including grain—and industrial equipment. Most of the Soviet Union's trade was with the countries of Eastern Europe, including Bulgaria, Czechoslovakia, Hungary, and Poland. The Soviet Union's chief trading partners outside Eastern Europe were Cuba, Finland, France, Germany, Italy, and Japan.

History

This section traces the major developments of the history of the Soviet Union, from the country's founding in 1922 until its breakup in 1991.

Background of the revolution. Since the mid-1500's, Russia had been ruled by leaders called *czars.* Under the czars, the country remained far behind the industrial progress made in Western Europe.

In the late 1890's, discontented Russians formed several political organizations. One group, the *Marxists,* followed the socialist teachings of Karl Marx, a German social philosopher. The Marxists established the Russian Social Democratic Labour Party. The *Bolsheviks* (later called Communists) made up a group within that party. The Bolshevik leader was Vladimir I. Ulyanov, who used the name V. I. Lenin.

After an economic depression began in Russia in 1900, a number of student protests, peasant revolts, and worker strikes broke out. In 1905, two uprisings were crushed by government troops, but the revolutionary movement forced the czar to establish an elective assembly, the Duma.

The February revolution. World War I began in 1914. Germany declared war on Russia in August of that year. Russia had enormous losses, and the people suffered severe shortages of food, fuel, and housing.

Early in March 1917, the people revolted. (The month was February in the old Russian calendar, which was replaced in 1918.) Riots and strikes over shortages of bread and coal grew more violent in the capital, Petrograd. (The city of Petrograd was known as St. Petersburg until 1914, was renamed Leningrad in 1924, and again became St. Petersburg in 1991.) Troops were called in to halt the uprising, but they joined it instead. The people of Petrograd turned to the Duma for leadership. Czar Nicholas II ordered the Duma to dissolve itself, but the parliament refused. The Duma established a *provisional* (temporary) government. Nicholas gave up the throne on March 15. Nicholas and his family were then imprisoned. Bolshevik revolutionaries shot them in July 1918.

A Soviet of Workers' and Soldiers' Deputies was also formed in Petrograd in March. It was a rival of the provisional government. Many similar soviets were set up throughout Russia. In April, Lenin demanded "all power to the soviets," and, in July, armed workers and soldiers tried to seize power in Petrograd. They failed. Lenin fled to Finland. Later that month, Alexander Kerensky, a socialist, became premier.

The October Revolution. Lenin returned from Finland in October and convinced the Bolsheviks that they should try to seize power. Lenin's most capable assistant, Leon Trotsky, helped him plan the take-over. On November 7 (October 25 in the old Russian calendar), the armed workers took over important points in Petrograd. After a bloody struggle in Moscow, the Bolsheviks controlled that city by November 15.

The Bolsheviks formed a new Russian government, headed by Lenin. Russia withdrew from World War I and began peace talks with Germany. In March 1918, Russia signed the Treaty of Brest-Litovsk with Germany. Under the treaty, Russia gave up large areas, including

Soviet military power paraded through Red Square in Moscow in annual May Day celebrations. The Soviet armed forces had about 4 million members and ranked as the largest in the world.

the Baltic states, Finland, Poland, and Ukraine. After the war, Armenia and Georgia set up independent republics.

In 1918, the Bolsheviks moved the Russian capital back to Moscow, which had been the centre of government until Czar Peter I made St. Petersburg the capital in 1712. The Bolsheviks also changed the name of their Russian Social Democratic Labour Party to the Russian Communist Party. They later changed the name to the Communist Party of the Soviet Union. They organized the Red Army, which was named after the colour of the Communist flag. The Communists themselves were called *Reds.*

Civil war. From 1918 to 1920, Russia was torn by war between the Communists and the anti-Communists, called *Whites.* The peasants supported the Reds. The Whites were aided by troops from France, Great Britain, Japan, the United States, and other countries that opposed the Communist government. The Whites were poorly organized, and the Reds defeated them.

After the civil war, the Red Army reconquered Georgia, Ukraine, and eastern Armenia, and put down nationalist independence movements in Belarus (then called Byelorussia) and central Asia. Communist rule was gradually established in these areas.

In 1920, Poland invaded Ukraine in an attempt to expel the Communists. The Red Army drove the invaders out and nearly reached Warsaw, Poland's capital. But the Polish troops, with help from France, finally defeated the Red Army. A treaty signed in 1921 gave Poland the western parts of Byelorussia and Ukraine.

The New Economic Policy. By 1921, seven years of war, revolution, civil war, famine, and invasion had exhausted Russia. Millions of people had died. Agricultural and industrial production had fallen disastrously. About 1 $\frac{1}{2}$ million Russians, many of them skilled and educated, had left the country. The people's discontent broke out in new peasant uprisings, in workers' strikes, and in a sailors' revolt at the Kronstadt naval base near Petrograd.

In 1921, Lenin established a compromise called the New Economic Policy (NEP) to strengthen the country. Small industries and retail trade were allowed to operate under their own control. The peasants no longer had to give most of their farm products to the government. The government kept control of the most important segments of the economy—banking, heavy industry, the transportation system, and foreign trade. The economy recovered steadily under the NEP.

Formation of the U.S.S.R. In December 1922, the Communist government established the Union of Soviet Socialist Republics (U.S.S.R.). Byelorussia, Transcaucasia, and Ukraine joined with Russia to make up the union's first four republics.

During the 1920's, three other union republics were established—Tadzhikistan (now spelled Tajikistan), Turkmenistan, and Uzbekistan. In 1936, Transcaucasia was divided into Azerbaijan, Armenia, and Georgia. Kazakhstan and Kyrgyzstan (then called *Kirghiz*) also became union republics in 1936.

Stalin gains power. Lenin became seriously ill in 1922. A struggle for power developed among members of the Politburo. Leon Trotsky ranked after Lenin in power. But the next two most important members of the Politburo—Lev Kamenev and Grigori Zinoviev—joined forces to oppose Trotsky. They chose Joseph Stalin to be their partner, greatly strengthening his position as general secretary of the party.

Stalin's influence in the party grew rapidly. Stalin defeated his rivals one by one. Trotsky lost power in 1925. Stalin then helped to expel from the party his own former partners, Kamenev and Zinoviev. Stalin's economic programme, the First Five-Year Plan, was introduced in 1928. By 1929, Stalin had become dictator of the Soviet Union.

Stalin's policies. The First Five-Year Plan had two major goals. First, most private enterprises would be taken over by the government. The NEP compromise would end. Second, the production of such heavy-industry products as chemicals, construction materials, machine tools, and steel would be expanded rapidly under highly centralized control.

A crisis in grain deliveries to the cities threatened to sink the First Five-Year Plan. Stalin forced the peasants into collective farms called *kolkhozy,* where they had to give most of their products to the government at low prices. These products were needed to supply raw materials to industry, to feed the people of the growing manufacturing centres, and to pay for imported machinery. The peasants opposed being forced to join collective farms, and destroyed much of their livestock and crops in protest. As punishment, Stalin had millions of peasants killed or exiled to prison labour camps in Siberia and the Aral-Caspian Lowland during the early 1930's.

In 1932 and 1933, a famine killed 5 million to 7 million

Important dates in the U.S.S.R.

1917 A revolution overthrew Czar Nicholas II in March. The Bolsheviks (later called Communists) seized power in November, led by V. I. Lenin.

1918-1920 The Communists defeated their anti-Communist opponents in a civil war.

1922 The U.S.S.R. was established. Joseph Stalin became general secretary of the Communist Party and began his rise to power as dictator.

1930's Millions of Soviet citizens died from a famine and the Great Purge. The famine was caused by a government policy that forced peasants onto state-owned farms. The Great Purge was Stalin's campaign to kill or imprison his opponents.

1941-1945 The Soviet Union fought on the side of the victorious Allies during World War II. The country suffered heavy casualties.

1953 Stalin died, and Nikita Khrushchev became head of the Communist Party.

1957 The U.S.S.R. launched Sputnik 1, the first spacecraft to circle the earth.

1958 Khrushchev became premier of the Soviet Union.

1961 Yuri Gagarin, a Soviet air force officer, became the first person to orbit the earth.

1962 The U.S.S.R. set up missile bases in Cuba and then removed them under pressure from the United States.

1964 High-ranking Communists forced Khrushchev to retire. He was replaced by Leonid Brezhnev as head of the Communist Party.

1979-1989 Soviet troops fought in Afghanistan to support a pro-Communist Afghan government against rebels.

1985 Mikhail Gorbachev became Communist Party head. He began to introduce policies of openness and reform.

1989 The first contested elections in Soviet history were held.

1991 Communist rule ended, and the republics declared their independence. The Soviet Union was dissolved.

people in Ukraine and in the Volga and Kuban regions of western Russia. The famine resulted from a government policy that forcibly took food from the farmers. Farm production lagged and the people's diets suffered, but Soviet industries expanded rapidly.

Many Soviet citizens opposed Stalin's policies during the mid-1930's. In order to crush opposition, Stalin began a programme of terror that was called the Great Purge. Secret police, the forerunners of the KGB, arrested millions of people. Neighbours and even family members spied on one another. Fear spread throughout the country. Stalin eliminated all real or suspected threats to his power by having the prisoners shot or sent to labour camps.

Adolf Hitler had become dictator of Germany in 1933, and one of his stated goals was to destroy Communism. But Hitler did not want enemies toward both the west and the east. In August 1939, the Soviet Union and Germany signed a *nonaggression pact,* an agreement that neither nation would attack the other. The two countries agreed secretly to divide Poland between themselves.

World War II began when Hitler's troops invaded Poland from the west on Sept. 1, 1939. Two days later, France and Great Britain declared war on Germany. Soviet troops invaded Poland from the east on Sept. 17, 1939, and soon occupied eastern Poland. On November 30, the U.S.S.R. attacked Finland. The Soviet Union had won much Finnish territory by March 1940, when Finland had to agree to a peace treaty.

In June 1940, the Red Army moved into Bessarabia (then part of Romania) and the Baltic countries of Estonia, Latvia, and Lithuania, which had become independent after the fall of the czar. In August 1940, the Baltic countries became separate republics of the Soviet Union, and most of Bessarabia became part of the new Moldavian Soviet Socialist Republic (now Moldova).

On June 22, 1941, a huge German force invaded the U.S.S.R. German warplanes destroyed much of the Soviet air force, and Hitler's tanks drove deep into Soviet territory. In September, the Germans captured Kiev and attacked Leningrad. By December, the Germans came close to Moscow. The attack on Leningrad lasted until January 1944, when the Germans were finally driven off. Great Britain and the other Western Allies welcomed the U.S.S.R. as a partner in the war against Germany.

Joseph Stalin, *centre,* one of the cruellest rulers in history, was dictator of the U.S.S.R. from 1929 to 1953.

By early 1942, the Red Army had driven the Germans back from the Moscow area and some other battlegrounds. The five-month Battle of Stalingrad (now Volgograd), which began in late August 1942, was a major turning point in the war.

The Red Army advanced steadily across Eastern Europe and into eastern Germany. As the Red Army swept across Eastern Europe, they freed many countries from German control, including Czechoslovakia, Hungary, Poland, and Romania. In April 1945, Soviet troops began to attack Berlin. The city fell to the Red Army on May 2. Germany surrendered to the Allies on May 7.

About 7½ million Soviet troops were killed in World War II, and about 5 million were wounded. Another 3 million troops were captured and died in German prison camps. No other country suffered so many military casualties. Also, millions of Soviet civilians died, whole regions of the U.S.S.R. lay in ruins, and much of the Soviet economy was shattered.

Beginnings of the Cold War. During World War II, Stalin had promised Roosevelt and Churchill to help promote freedom throughout the world. After the war, however, the Soviet Union cooperated with the Allies only in continuing an agreement to occupy the eastern zone of Germany and a sector of Berlin. East-West relations in Germany became tense. The U.S.S.R. set up a Communist police state in its zone and blocked Western efforts to unite Germany.

Red Army units remained in the Eastern European countries that they had freed from German control during the war. These units helped Communist governments, supported by the Soviet Union, take power in these nations.

By early 1948, the U.S.S.R. controlled seven countries in Eastern Europe. These *Soviet satellites* (countries controlled by the U.S.S.R.) were Albania, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, and Yugoslavia.

The U.S.S.R. also controlled its East German occupation zone, which surrounded West Berlin. In June 1948, Soviet troops blocked all land and water routes to West Berlin. The Western powers then flew food and other supplies to West Berlin daily. The blockade ended in May 1949.

The U.S.S.R. cut off nearly all contacts between its satellites and the West. Its barriers against communication, trade, and travel came to be known as the Iron Curtain. Distrust grew between East and West. The Cold War, a struggle between the two sides for international influence and allies, spread through Europe and many other regions of the world.

The rise of Khrushchev. Rapid Soviet industrialization resumed after World War II under new five-year plans. Restrictions on the peasants, which had been loosened during the war, again became severe. Stalin also began a new wave of political arrests and executions. Then, on March 5, 1953, he died after a stroke.

A *collective leadership* of several men ruled after Stalin. For almost two years, Georgi Malenkov held the major leadership position as premier, or chairman of the Council of Ministers. During this period, a struggle for power developed among Malenkov and other leading Communists. Nikita Khrushchev became the Communist Party head in September 1953. Khrushchev outmanoeuvred Malenkov, who was forced to resign in 1955. Khrushchev defeated his rivals. In 1958, he became premier as well as Communist Party leader.

Khrushchev's policies were more liberal than Stalin's, and Soviet relations with the West improved after Stalin's death. In 1956, Khrushchev announced a policy of *peaceful coexistence.* He described it as a means of avoiding war while competing with the West in technology and economic development.

China's Communist government believed war with the West was necessary and criticized the "soft" Soviet policy. China also wanted Soviet aid. The dispute between the two Communist powers peaked at the 22nd Communist Party Congress in Moscow in 1961. The Chinese premier, Zhou Enlai, suddenly returned to China. Only Albania supported China.

Under Khrushchev, the Soviet Union began to spend huge sums on space exploration. In 1957, Soviet scientists launched Sputnik 1, the first spacecraft to circle the earth. In 1961, Yuri Gagarin, a Soviet air force officer, became the first person to orbit the earth.

Relations with the United States. In 1960, an American U-2 plane was shot down over Soviet territory. The pilot confessed he had been spying, and President Dwight D. Eisenhower admitted that U.S. planes had been flying over the Soviet Union taking photographs for four years. Khrushchev demanded an apology, but Eisenhower refused.

Another crisis occurred in 1962. The United States learned that the Soviet Union had missile bases in Cuba. These bases could have launched nuclear attacks against the United States or other parts of the Western Hemisphere. President John F. Kennedy ordered a naval *quarantine* (blockade) of Cuba and demanded the removal of all the missiles and bases. Following a tense exchange of notes between the leaders, Khrushchev met these demands.

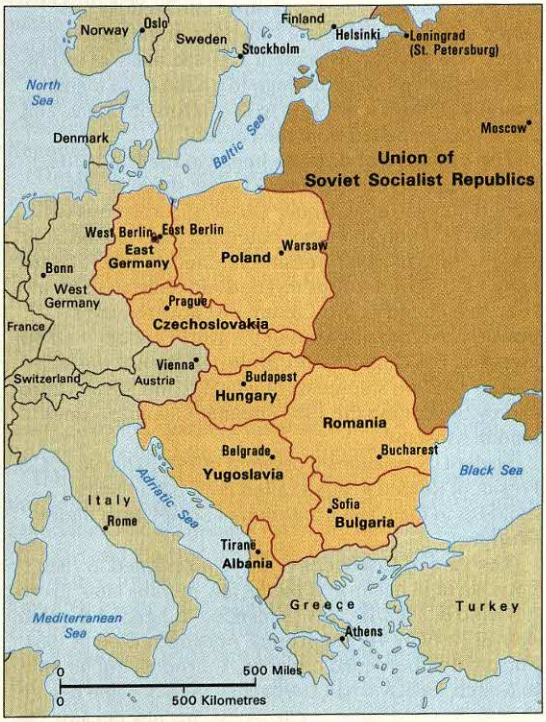
In 1963, the U.S.S.R., the United States, and Great Britain signed a treaty prohibiting all nuclear weapons tests except those conducted underground. Also in 1963, the Soviet Union and the United States set up a direct teletype connection called the *hot line* between Moscow and Washington, D.C. They hoped it would help prevent any misunderstanding from leading to war.

Brezhnev comes to power. Although Khrushchev improved Soviet relations with the West, many of his other policies failed. In 1964, a conspiracy among the highest-ranking Communists led to the overthrow of Khrushchev. Khrushchev was replaced by Leonid Brezhnev as Communist Party head and Aleksei Kosygin as premier.

The new leaders took power amid worsening Soviet relations with a number of countries. In Eastern Europe, several Soviet satellite countries sought to lessen Soviet control and follow their own policies. For example, the government of Czechoslovakia began a reform movement to give the people more freedom. In 1968, Soviet troops invaded Czechoslovakia and crushed this movement. In 1969, fighting broke out between the Soviet Union and China over a disputed border region.

In Africa, however, Soviet influence expanded during the 1970's. The Soviet Union supplied military equipment and advisers to Communist groups that sought to gain, or keep, control of African lands.

The Soviet Union's control of Eastern Europe
By the late 1940's, the Soviet Union occupied East Germany and controlled seven Eastern European countries. These Soviet *satellites* are shown on the map below. Communist rule ended in most of these countries in the late 1980's and early 1990's.



Like Khrushchev, Brezhnev and Kosygin tried to step up the production of consumer goods and the construction of housing. The Soviet economy made important gains, though it never met government goals. The rate of growth of Soviet industrial production began to decline. Also, agricultural production suffered from planning problems and a series of disastrous harvests.

During the early 1970's, Brezhnev's power increased at Kosygin's expense. By the mid-1970's, Brezhnev was dominant.

Détente. Brezhnev pursued a policy of friendlier relations with the West. This easing of tensions between East and West became known as *détente.* Brezhnev sought détente chiefly to improve the Soviet Union's economic and military position. In all, Soviet foreign trade increased about fivefold from 1970 to 1980. Soviet industry, however, continued to lag.

In 1972, the Soviet Union and the United States signed two agreements to limit nuclear arms. These agreements resulted from a series of meetings called the Strategic Arms Limitation Talks (SALT). In 1975, the leaders of the Soviet Union and many other countries agreed to honour such basic human rights as freedom of thought and freedom of religion. This pledge, called the Final Act, was one of several agreements known as the Helsinki Accords.

During détente, Western ideas entered the Soviet Union along with Western goods and technology. Some of these ideas challenged the government's level of control over the lives of its citizens. Some groups, such as Jews and Germans, demanded and received the right to emigrate. Soviet writers and other intellectuals protested against government violations of the people's rights. The Soviet government arrested many of its critics. It sentenced some of them to prison or to mental hospitals. Others were sent to live in remote areas, and a few were expelled from the country.

The collapse of détente began in the late 1970's. United States President Jimmy Carter strongly supported human rights. Under Carter, U.S. relations with the Soviet Union and other countries that violated their citizens' human rights became strained. In late 1979 and early 1980, Soviet troops invaded Afghanistan to try to keep that country's pro-Communist government in power. Governments around the world condemned the invasion. The United States protested against the invasion by limiting shipments of wheat to the Soviet Union and by boycotting the 1980 Summer Olympic Games held in Moscow.

Soviet-U.S. relations worsened in 1981. That year, U.S. President Ronald Reagan called for a U.S. military build-up to match an expansion of Soviet arms under Brezhnev.

The rise of Gorbachev. Kosygin resigned in 1980 because of ill health and died a few months later. Brezhnev died in 1982. He was succeeded as head of the Communist Party by Yuri Andropov. Andropov died in 1984. Konstantin Chernenko replaced Andropov, but he died in March 1985. Mikhail Gorbachev then became head of the Communist Party. At age 54, Gorbachev became the first member of a new generation of Soviet leaders to head the country.

Gorbachev's reforms. Under Gorbachev, the Soviet Union changed rapidly. Gorbachev sought to improve economic performance by means of the policy of *perestroika.* He wanted to restructure the economy to stimulate growth and increase efficiency in Soviet industry. The reforms failed and even made things worse. Shortages increased. Inflation grew, and hoarding became widespread.

The most striking change was a new policy of openness called *glasnost.* Gorbachev introduced *glasnost* to help win popular support for his policies and overcome resistance to *perestroika* in the Communist Party and the Soviet government. *Glasnost* made it possible to discuss political and social issues critically and with more freedom than ever before in the Soviet Union. Also, a new freedom of expression in literature and the arts developed, and books by opponents of Communism became available in shops.

The Soviet Communist Party resisted Gorbachev's reforms, and so he promoted a reduction in the role of the party. In March 1989, the Soviet Union held its first contested elections in history. These elections, to the newly created Congress of People's Deputies, resulted in the defeat of many top Communist Party officials and several top generals. The Communist Party's role was further reduced in March 1990, when the Soviet government voted to permit the creation of non-Communist political parties in the Soviet Union.

Under Gorbachev, the Soviet Union's relations with the West improved. In 1987, Gorbachev and Reagan signed a treaty to dismantle all their ground-launched medium-range nuclear missiles. Between May 1988 and February 1989, Soviet troops withdrew from Afghanistan. In 1991, Gorbachev and U.S. President George Bush signed the Strategic Arms Reduction Treaty (START). This agreement, which would take effect when approved by the legislatures of both countries, ordered a reduction in the numbers of U.S. and Soviet long-range nuclear weapons.

In March 1990, the Soviet government created the office of president of the U.S.S.R. The president became the head of the central government and the most powerful person in the Soviet Union. Previously, the head of the Communist Party had the most power. The Congress of People's Deputies elected Gorbachev as the first president of the U.S.S.R.

Threats to unity. Soviet control over Eastern Europe ended in 1989. Popular support for reform unseated most of the Communist parties that had controlled Eastern European countries.

Powerful popular movements in many regions of the Soviet Union had long demanded greater freedom from the central government. Such movements began to gain strength during the late 1980's, particularly in the Baltic republics of Estonia, Latvia, and Lithuania. In 1990, Lithuania declared independence, and Estonia and Latvia called for a gradual separation from the Soviet Union. By the end of 1990, all 15 republics had declared that laws passed by their legislatures took precedence over laws passed by the central government.

To prevent further disintegration, Gorbachev proposed a union treaty designed to satisfy demands by the republics for more control over their affairs. In July 1991, Gorbachev and the leaders of 10 republics reached agreement on a treaty that would give the republics a large amount of independence. The treaty was to be signed by five of the republics on August 20.

On August 19, before the treaty could be signed, conservative officials of the Communist Party attempted a *coup* (overthrow) against Gorbachev's government. The coup leaders imprisoned Gorbachev and his family in their holiday home. The president of the Russian republic, Boris Yeltsin, led opposition to the coup, which collapsed on August 21. Yeltsin's role in defying the coup increased his power and prestige both at home and abroad. After the coup, Gorbachev returned to the office of president but never regained full power. He then resigned as head of the Communist Party. Also, the Supreme Soviet suspended all Communist Party activities for an indefinite period.

The breakup of the Soviet Union. The collapse of the coup renewed demands by the republics for more control over their own affairs. By November, 13 of the 15 republics—all except Russia and Kazakhstan—had declared independence. However, 11 of the republics—all but the Baltic republics and Georgia—had agreed to remain part of a new, loose confederation of self-governing states. Many of the republics viewed this confederation as only a temporary arrangement.

The Congress of People's Deputies formed a *transitional* (temporary) government that would maintain the unity of the country until a new union treaty could be written. The transitional government recognized the independence of the Baltic republics in September 1991.

The final blow to Soviet unity came in December. On December 8, Yeltsin and the presidents of Belarus and Ukraine met in Minsk, Belarus. The leaders announced that they had formed a new, loose confederation called the Commonwealth of Independent States. They declared that the Soviet Union had ceased to exist and invited the remaining republics to join the commonwealth. Most soon did so. On December 25, Gorbachev resigned as Soviet president, and the Soviet Union was formally dissolved.

Related articles in ***World Book*** include:

Biographies

Andropov, Yuri V.
Brezhnev, Leonid I.
Bulganin, Nikolai A.
Chernenko, Konstantin U.
Gorbachev, Mikhail S.
Gromyko, Andrei A.
Kerensky, Alexander F.
Khrushchev, Nikita S.
Kirilenko, Andrei P.
Kosygin, Aleksei N.
Krupskaya, Nadezhda K.
Lenin, V. I.
Malenkov, Georgi M.
Molotov, Vyacheslav
Ryzhkov, Nikolai I.
Sakharov, Andrei D.
Stalin, Joseph
Suslov, Mikhail A.
Tikhonov, Nikolai A.
Trotsky, Leon
Yeltsin, Boris N.
Zhukov, Georgi K.

History

Bolsheviks
Cold War
Communism
Iron Curtain
KGB
Mensheviks
Politburo
Russo-Finnish wars
Stalingrad, Battle of
Strategic Arms Limitation Talks
Warsaw Pact
World War I
World War II
Yalta Conference

Former union republics

Armenia
Azerbaijan
Belarus
Estonia
Georgia
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Moldova
Russia
Tajikistan
Turkmenistan
Ukraine
Uzbekistan

Other related articles

Commonwealth of Independent States
Soviet
Tass
Women's movements (In Eastern Europe and the former Soviet Union)

Outline

I. Government
  A. The Communist Party
  B. National government
  C. Local government
  D. Armed forces
II. People
III. Way of life
  A. Personal freedom
  B. Privileged classes
  C. City life
  D. Rural life
  E. Education
  F. Science and technology
  G. Arts
IV. Economy
  A. Manufacturing
  B. Agriculture
  C. Foreign trade
V. History

Questions

Who planned the October Revolution of 1917?
Which nationality groups made up the largest percentage of the total Soviet population?
What were *glasnost* and *perestroika*?
What were the major goals of Stalin's First Five-Year Plan?
Why did the Soviet Union break apart?
Who was the Soviet Union's first president?
What were some ways in which Soviet life differed under Joseph Stalin and under Nikita Khrushchev?
Why did the Communists restrict religious practices?
What was the most powerful government body in the Soviet Union?
What Soviet achievement started the space age?

Unionist parties, in Northern Ireland, are political parties that support the continuation of the *union* (political link) between Northern Ireland and Great Britain. Unionists strongly favour the inclusion of Northern Ireland within the United Kingdom and oppose any political changes that would make Northern Ireland part of the Republic of Ireland.

The parties. Several parties in Northern Ireland include the word *Unionist* as part of their titles. Most of them came into existence during the 1970's. Unionist parties generally draw their support from among Northern Ireland's Protestants. Some parties are more extreme than others, especially over the British government's efforts to combat terrorism. Unionists in general oppose direct rule by Britain's central government. They demand self-government for Northern Ireland within the United Kingdom. But they have usually rejected any proposal involving sharing power with parties claiming Roman Catholic or Republican support.

The Northern Ireland Unionist parties represented in the British Parliament are the Ulster Unionist Party, often called the Official Unionist Party; the Democratic Unionist Party; and the Ulster Popular Unionist Party.

History. Ireland formally became part of the United Kingdom by the Act of Union, which was passed in 1800 and came into effect in 1801. The political label *Unionist* first developed in the late 1800's among politicians who opposed the movement for independence for Ireland. In 1886, the Liberal Prime Minister William Ewart Gladstone proposed a bill giving Ireland home rule. But a group of Liberals under Joseph Chamberlain joined with the Conservative opposition to defeat Gladstone's bill. Chamberlain's supporters called themselves Liberal Unionists. In 1909, the Conservative Party changed its name to the Conservative and Unionist Party to demonstrate its opposition to Irish Home Rule.

After the partition of Ireland in 1921, Northern Ireland continued sending members of Parliament to Westminster, as well as developing its own parliament at Stormont. The Ulster Unionist Party came to dominate Northern Ireland's parliamentary representation. In 1969, events again brought violence and terrorism to the communities in Northern Ireland. The Ulster Unionist Party began to split up.

Some of the parties that then emerged retained the label *Unionist.* In 1970, Ian Paisley, a Presbyterian minister, stood for the Northern Ireland Parliament as a Protestant Unionist and defeated the official Ulster Unionist candidate in North Antrim. In 1971, Paisley founded the Democratic Unionist Party. In 1974, an election to the Westminster Parliament was won by opponents of Brian Faulkner's power-sharing executive. These opponents, who were members of various unionist factions, stood as members of the United Ulster Unionist Council. The Unionist parties reverted to individual representation at Westminster in the election of 1979.

Unit, in measurement, is a quantity adopted as the standard by which any other quantity of the same kind is measured. The standard units of measure used in science, commerce, and industry have been tabulated in groups called *tables of denominate numbers.* There are units of money, length, time, surface, volume, weight, and many other things.

See also **Denominate number; Measurement; Metric system; Weights and measures.**

Unit trust is an investment company or trust that pools money from many investors and uses it to buy stocks and other securities. In exchange for their money, the investors receive shares. The price of a share rises or falls, according to the market prices of securities owned by the trust.

A unit trust is often called a pooled investment fund, but not all pooled funds are unit trusts. A unit trust is known as an open-ended investment trust in the U.S.A. Such a trust allows a large number of people to pool their money for investment purposes. The amount invested varies from investor to investor and may be very small or quite large. Individuals may add to their investment at any time, and will receive some new shares, which is why unit trusts are sometimes called open-ended investments. Individuals with only a small amount to invest benefit from using a unit trust because their money is managed by experts. The trust manager has access to information and research on which to base investment decisions. The trust manager invests the funds in a number of securities, thereby spreading the risk. Individuals may also sell their shares or units quickly if necessary. Unit trust shares must be sold back to the trust management, not through a stock market. The unit trust management calculate the value of their fund regularly. They change the sale and purchase prices in line with changes in the total value of the fund. Investors pay a small management fee for expertise and administration.

Some unit trusts, called *growth funds,* invest mostly in common shares of companies that have grown rapidly. *Income funds* invest in stocks and bonds to give the highest possible percentage yield. *Money market funds* invest in treasury bills and other securities that yield returns closely tied to interest rates. Money market funds provide protection against inflation because interest rates rise when inflation is expected to increase.

A closed-ended investment is known as an *investment trust* in the UK. Investment trust shares can be bought and sold through a stock market, and their price depends directly on market forces. The total number of investment trust shares does not vary.

See also **Money market fund.**

Unitarians believe in the unity of God, rather than in the doctrine of the Trinity as found in the historic creeds of the Christian church. Unitarians also deny the deity of Jesus Christ and hold that all human beings are divine. They believe that salvation is by character and not by the *Atonement* (see **Atonement**). They stress the need to apply religious principles to social problems. They also try to integrate scientific findings with their beliefs. Members of unitarian churches are free to form their own religious beliefs, because the Church has no dogmas or creeds.

Each unitarian congregation is independent. But, in many parts of the world, the congregations are connected with national assemblies or associations of unitarian churches. There are unitarian churches in Australia, Canada, Czechoslovakia, Denmark, Germany, Hungary, India, New Zealand, Nigeria, Poland, Romania, South Africa, the United Kingdom, and the United States.

The early history of Christianity reveals traces of unitarianism. But unitarianism in its present form did not begin until the Reformation, in the 1500's. Early unitarians include the Spanish doctor and theologian Michael Servetus (1511-1553), the Italian religious teacher Lelius Socinus (1525-1562), and Socinus's nephew Faustus Socinus (1539-1604).

Unitarians established themselves as organized communities in Poland, Hungary, and England during the 1500's and 1600's. George Blandrata, an Italian doctor, became leader of an active group of unitarians in 1558. He went to Hungary in 1563 and spread unitarianism there. Faustus Socinus was the leading figure in unitarianism from 1579 to 1604. He particularly influenced the Polish unitarians who published in 1605 the *Racovian Catechism,* based on his work. This first statement of unitarian principles was also adopted in Hungary. Unitarianism was outlawed in Poland after the Counter Reformation (see **Counter Reformation**).

John Biddle (1615-1662) is regarded as the founder of unitarianism in England. But the main development of English Unitarianism came during the 1700's, when many churches that had previously been Presbyterian became Unitarian. The British and Foreign Unitarian Association was formed in 1825. The first unitarian church in the United States was King's College Chapel in Boston, Massachusetts, established in 1785. Unitarians and universalists in the United States combined to form the Unitarian Universalist Association in 1961.

United Arab Emirates is a federation of seven independent Arab states in southwestern Asia. These states lie along the eastern coast of the Arabian Peninsula, at the south end of the Persian Gulf. From west to east, they are Abu Dhabi, Dubayy (also spelled Dubai), Ash Shariqah, Ajman, Umm al Qaywayn, Ras al Khaymah, and Al Fujayrah. The capital city of each state has the same name as the states.

Most people of the United Arab Emirates (UAE) are Arab Muslims. About four-fifths of them live in urban areas. The city of Abu Dhabi is the federation's capital and second largest city. Dubayy, the largest city, is an important port and commercial centre.

Beginning in the mid-1800's, Great Britain began to protect the states from attack by outsiders. By the early 1900's, Britain had taken control of the states' foreign affairs and guaranteed their independence. Known as the Trucial States, the states remained under British protection until 1971, when they gained full independence. That year, six of the states joined together and formed the United Arab Emirates. Ras al Khaymah joined the union in 1972.

Before the mid-1900's, the region that is now the UAE was one of the most underdeveloped in the world. Most of the people earned a living by fishing and pearl fishing, herding camels, trading, or date farming. The discovery of oil during the late 1950's brought sudden wealth to the region and led to the development of modern industries and cities. Many people left their traditional ways of life and took jobs in the oil industry and other modern fields. By the 1970's, the United Arab Emirates had one of the world's highest *per capita* (per person) incomes.

Facts in brief about the United Arab Emirates

Capital: Abu Dhabi.
Official language: Arabic.
Area: 83,600 km². *Greatest distances*— north-south, 402 km; east-west, 563 km. *Coastline*—777 km.
Elevation: *Highest*—Jabal Yibir, 1,527 m above sea level. *Lowest*—Salamiyah, a salt flat slightly below sea level.
Population: *Estimated 1996 population*—1,820,000; density, 22 people per km²; distribution, 78 per cent urban, 22 per cent rural. *1980 census*—1,043,225. *Estimated 2001 population*—2,007,000.
Chief products: *Agriculture*—dates, melons, tomatoes. *Fishing*—fish, shrimp. *Mining*—petroleum, natural gas.
Flag: The flag has a vertical red stripe and horizontal stripes of green, white, and black. It was adopted in 1971. See **Flag** (picture: Flags of Asia and the Pacific).
Money: *Currency unit*—UAE dirham. One dirham = 100 fils.

Government. Each of the seven states of the UAE is called an emirate and is ruled by an *emir* (prince). Each emir controls his state's internal political and economic affairs. The federal government controls the UAE's foreign affairs and defence and plays a large role in the federation's economic and social development.

The seven emirs form the Supreme Council of the UAE. The council appoints a president, who serves as chief executive and head of state of the UAE. It also appoints a prime minister. The prime minister heads a Council of Ministers, which has about 25 members who supervise various federal government departments. Each emir appoints representatives to the federal legislature, called the Federal National Council.

People. Most of the people of the UAE are Arabs. They belong to tribes that have lived in the region for hundreds of years. Each tribe has its own traditions. Rivalries among the various tribes have made it difficult to establish a unified nation.

Since the 1960's, thousands of people from neighbouring Arab countries and from India, Iran, and Pakistan have come to the UAE to work in the oil and construction industries and in commerce. The rapid increase in population has caused housing shortages and other problems. But money from the oil industry and other economic activities has enabled the UAE to build apartment buildings, schools, hospitals, and roads to meet the needs of the growing population.

Most city-dwellers in the UAE live in modern houses or apartment buildings. But in rural areas and on the outskirts of the cities, many people live in small thatched huts, much as their ancestors did hundreds of years ago. Some of the people wear Western clothing, but most prefer traditional Arab garments. Arabic is the official language of the UAE. About half of all the people 15 years of age or older can read and write. Today, about three-quarters of all school-age children attend primary school.

Land and climate. The UAE covers 83,600 square kilometres, including some islands in the Persian Gulf. Swamps and salt marshes line much of the northern coast. A desert occupies most of the inland area. Water wells and oases dot the desert. The largest oasis, Al Buraymi, is located in both the UAE and in Oman, the country's neighbour to the east. Hills and mountains cover much of the eastern part of the UAE.

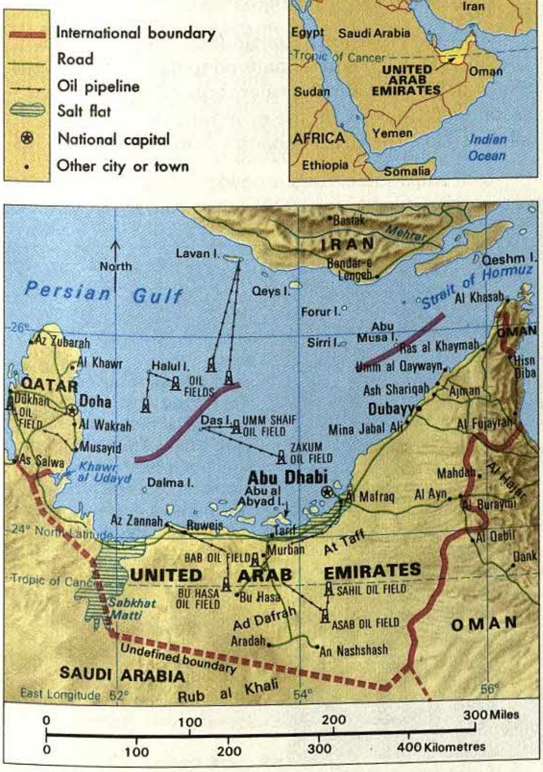
The United Arab Emirates has a hot climate with little rainfall. The humidity is often high along the coast, but the inland desert regions are dry. The mountainous areas are generally cooler and receive more rainfall than the rest of the country. Summer temperatures in the UAE average more than 32° C and often reach 49° C. In winter, temperatures in the UAE seldom drop below 16° C. The country receives an average of less than 13 centimetres of rain a year.

Economy of the United Arab Emirates depends largely on the production and export of petroleum. Most of this oil production takes place in the states of Abu Dhabi, Dubayy, and Ash Shariqah. The rulers of these emirates earn large profits from the sale of oil to foreign countries. Much of the petroleum is exported in crude form. But the UAE also has refineries that process some of the crude oil. The UAE is a member of the Organization of Petroleum Exporting Countries (OPEC). The production of natural gas, and trading and banking activities also bring income to the UAE.

Less than 1 per cent of the land of the UAE is suitable for growing crops. Farmers in the desert oases and the hilly regions of the eastern UAE grow dates, melons, tomatoes, and other crops. Desert nomads tend herds of camels, goats, and sheep. People who live in the coastal areas catch fish, shrimp, and other seafoods.

Dubayy, Abu Dhabi, and Ash Shariqah are the chief ports of the UAE. In addition to oil, the country exports natural gas and small amounts of dates and fish. Leading imports include building supplies, clothing, food products, household goods, and machinery.

United Arab Emirates



Roads link the major cities and towns of the United Arab Emirates. The country has four international airports. Several of the states operate radio stations, and Abu Dhabi and Dubayy have television stations.

History. People have lived in what is now the UAE for thousands of years. The chiefs of Arab tribes gradually gained control of the region. The tribes adopted Islam, the Muslim religion, by the A.D. 600's.

The Persian Gulf region lay on a major world trade route. Beginning in the 1500's, various European nations established trading posts in the area. Great Britain became the strongest European power in the Persian Gulf region. During the 1700's, the Arab states that now make up the UAE began to develop. At first, Ras al Khaymah and Ash Shariqah were the strongest states. Their strength came from their naval power, and from the wealth they obtained from such activities as pearl fishing and trading.

In the late 1700's and early 1800's, Ras al Khaymah and Ash Shariqah fought many wars with other gulf states for control of the region's trade. The British aided the rivals of Ras al Khaymah and Ash Shariqah. In 1820, after destroying the city of Ras al Khaymah, the British forced all the states in the region to sign a truce forbidding warfare at sea. Other truces were signed in the 1800's, and the region became known as the *Trucial States* because of the truces. By the early 1900's, Abu Dhabi and Dubayy had become the leading states. But Britain had taken control of the states' foreign affairs and had guaranteed them protection from attack by outsiders. The states' rulers continued to handle internal matters. Until the mid-1900's, traditional rivalries over boundaries, pearl fishing rights, and other disputes led to wars among the states.

Oil pipelines cross desert regions in the United Arab Emirates (UAE). The oil industry provides jobs for thousands of people from the UAE and from several neighbouring Arab countries.

In the mid-1900's, foreign oil companies began to drill for oil in the Trucial States. In 1958, oil was discovered in Abu Dhabi, and the state began to export crude oil in 1962. Large oil deposits were found in Dubayy in 1966. Oil production began in Ash Shariqah in 1974. Money from oil production enabled Abu Dhabi, Dubayy, and Ash Shariqah to begin to develop into modern states. Other states later began to produce some oil. But they continued to rely chiefly on agriculture and fishing as the basis of their economies.

In 1971, the Trucial States gained full independence from Britain. In spite of traditional rivalries, all the states except Ras al Khaymah joined together and formed the United Arab Emirates on Dec. 2, 1971. That same year, the UAE became a member of the Arab League and the United Nations. Ras al Khaymah joined the UAE in February 1972.

Under the Provisional Constitution adopted by the UAE in 1971, each emir continued to handle the internal affairs of his state. But the rulers agreed to share their resources and work for the economic development of all the states. The UAE's economy boomed in the 1970's

Abu Dhabi is the capital of the United Arab Emirates and the capital of the emirate of Abu Dhabi. The city is modern, but it retains many of its traditions. The picture on the left shows a modern street alongside a traditional *mosque* (Muslim house of worship).

as oil production increased. In addition, natural gas deposits were discovered in Ash Shariqah. But in the 1980's, worldwide oil prices fell, causing difficulties for the UAE's economy.

In August 1990, Iraq invaded Kuwait. In early 1991, the UAE and other GCC members took part in the allied air and ground offensive that liberated Kuwait. See **Persian Gulf War.**

See also **Abu Dhabi; Organization of Petroleum Exporting Countries.**

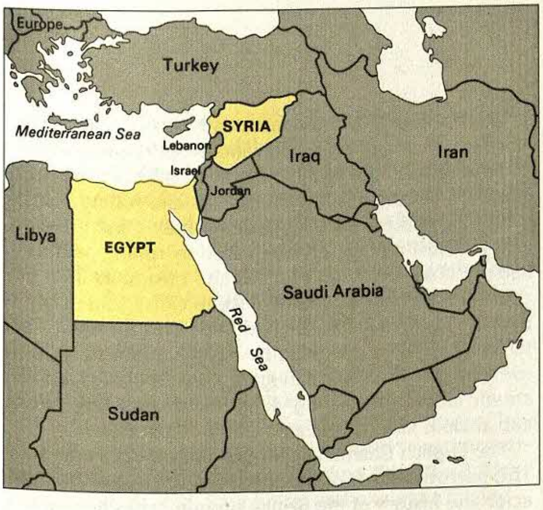
United Arab Republic (U.A.R.) was a union of two independent Middle Eastern countries, Egypt and Syria. President Gamal Abdel Nasser of Egypt and Shukri al-Kuwatly of Syria proclaimed the union on Feb. 1, 1958. Syrian rebels ended it on Sept. 29, 1961, setting up an independent government for Syria. Egypt continued to use the name United Arab Republic until 1971, when it changed its official name to the Arab Republic of Egypt. In April 1963, Egypt, Syria, and Iraq agreed to form a new U.A.R. But because of political differences among the countries, the agreement was not carried out.

Government. The U.A.R. of 1958 had a centralized government, with Cairo as the capital. Egypt and Syria became provinces, with provincial capitals at Cairo for Egypt and Damascus for Syria.

Soon after the merger, the people adopted a provisional constitution and chose Nasser as president. He appointed all members of the National Assembly, selecting half from Egypt and half from Syria. The assembly supposedly exercised legislative power, but Nasser made many decisions without consulting it.

History. Before World War I (1914-1918), most of the Middle East was part of the Ottoman Empire. However, Great Britain had gained control of Egypt in the 1880's, and kept it until Egypt became independent in 1922. After World War I, the Middle East was carved into a number of political divisions. Syria, along with Lebanon, became a League of Nations mandate of France, which controlled them until after World War II (1939-1945).

Following World War II, many Arabs wanted to be united under a single government. Nasser came into power in Egypt during the 1950's, and became the leader of the Arab unity movement. Many Arab leaders suspected the West and turned to the Soviet Union for assistance. Nasser accepted Soviet aid, although he suppressed Communism within Egypt. The Communists also gained great power in Syria. The desire for Arab unity, the fear of Communist influence in Syria, and Nasser's ambition all contributed to the formation of the United Arab Republic.



Location of the United Arab Republic

Nasser regarded the union of Egypt and Syria as the first step toward uniting all Arab states. On March 8, 1958, Yemen agreed to form a federation with the U.A.R. The union was called the United Arab States, and had Hodeida (now Al Hudaydah), Yemen, as its permanent seat. The United Arab States was not a true federation. Yemen maintained its own membership in the United Nations and separate relations with other countries. Nasser dissolved the United Arab States in December 1961.

Nasser made clear that the U.A.R. would be neutral in world affairs. In 1959, he accused the Soviet Union of trying to interfere with the internal affairs of the republic. He also improved relations with the West.

The government introduced many reforms in both provinces. But many Syrians began to feel that Nasser was raising the level of living in Egypt only by lowering it in Syria. Finally, late in 1961, Syrian officers in the U.A.R. army carried out an almost bloodless revolt and proclaimed an independent Syria. The Baath Party, the ruling party in Syria and Iraq, blocked a new federation attempt in 1963. The party opposed Nasser's attempt to control the new U.A.R.

See also **Egypt; Iraq; Nasser, Gamal Abdel; Syria; Yemen.**

United Arab States. See **United Arab Republic.**

United Church of Christ is a Protestant religious denomination in the United States. It was formed in 1957 by the merger of the Congregational Christian Churches and the Evangelical and Reformed Church.

The United Church of Christ has a *general synod* (central committee) that directs business affairs and nominates church officials. However, individual congregations have the right to govern themselves.

In 1931, the Congregational churches merged with a union of three small church groups to form the Congregational Christian Churches. The Evangelical and Reformed Church was formed in 1934 by the union of two American churches of German background.

See also **Congregationalists.**

United Irishmen were members of a movement that aimed to unite Irish Protestants and Roman Catholics in an effort to make Ireland independent of Britain and establish a truly national Irish parliament. In 1791, Theobald Wolfe Tone, Rowan Hamilton, and Napper Tandy founded the Society of United Irishmen in Belfast. In 1798, the United Irishmen rose in rebellion in parts of Leinster and in northeastern Ulster. The Catholics of County Wexford put up the strongest fight of the insurgent counties. They were led by Father John Murphy. The Presbyterians of Antrim and Down fought bravely against superior numbers, but were quickly suppressed. The French sent over an army of 1,000 men under General Humbert, but they were defeated by an English army under Lord Cornwallis. In 1801, the Act of Union joined the legislatures of Great Britain and Ireland.

Much of England's countryside is laid out in a patchwork of fields, meadows, and small towns and villages. This scene is a view from the Malvern Hills, in Hereford and Worcester.

United Kingdom

United Kingdom is an island country in northwestern Europe. More than 70 countries are larger in size, and the United Kingdom has only about 1 per cent of the world's people. It has few natural resources. Yet for hundreds of years, the United Kingdom has been one of the world's most important countries. The British started the Industrial Revolution. They founded the largest empire in history. They have produced some of the world's greatest scientists, explorers, artists, and political leaders.

The United Kingdom is really four countries united under one government. These countries are England, Northern Ireland, Scotland, and Wales. The nation's official name is the United Kingdom of Great Britain and Northern Ireland. Most people call the country the *United Kingdom,* the *UK, Great Britain,* or simply *Britain.* London is the capital and largest city.

The landscape varies dramatically throughout the UK. Northern Scotland is a wild, windswept region, broken by long arms of the sea that reach far inland. Much of Northern Ireland has low mountains and rolling fields. Wales is famous for its rugged mountains and green valleys. Most of England is covered by rolling plains, laid out in a patchwork of fields and meadows. The coastline is a shifting scene of steep cliffs, golden beaches, jagged rocks, and fishing towns tucked in sheltered bays. The old and the new can be found almost everywhere. The UK has magnificent old castles and atomic laboratories, snug villages and sprawling cities, and ancient universities and modern factories.

The English Channel separates the UK from France. This narrow stretch of water has helped shape the character and history of the British people. It has helped protect the UK from invasion, and has given the people a

Derry, in Northern Ireland, is a historic city. The gate in the old city wall, *above,* dates from the 1600's.

Caerphilly Castle, near Cardiff, in Wales, is a large and impressive example of a medieval fortress.

Brighton, in southern England, has been a popular seaside resort for about 200 years. Brighton is in East Sussex.

Kirkwall, in Scotland, is capital of the Orkney Islands. The islands have been inhabited since prehistoric times.

feeling of security. Since 1066, no enemy has crossed the channel and invaded the country.

Crowded together on their "tight little island," cut off from the rest of Europe by the sea, and secure from invasion, the British developed their own character and way of life. They came to respect privacy and to value old traditions. They developed a dry wit, a love for personal freedom, and a high degree of self-criticism. The British have shown themselves at their best—brave and united—in times of crisis. Their courage against German bombs and overwhelming odds during World War II (1939-1945) won the admiration of the world.

The history of the United Kingdom is the story of how a small island country became the world's most powerful nation—and then declined. In the 1700's, the British began the Industrial Revolution and made the United Kingdom the world's richest manufacturing country. The British ruled the seas, and were the world's greatest traders. By 1900, they had an empire that covered about a fourth of the world's land and included about a fourth of its people. They spread their way of life throughout their empire.

Then came the 1900's—and the shock of two crippling world wars. The British Empire began to fall away. The UK faced one economic crisis after another. Today, the UK is still a leading industrial and trading nation. But it is no longer the world power it once was.

This article discusses the government, people, land, climate, and economy of the United Kingdom. For more detailed information on government, see **United Kingdom, Government of the.** For information on history, see **United Kingdom, History of the.** For detailed information on each country of the United Kingdom, see **England; Northern Ireland; Scotland;** and **Wales.**

United Kingdom in brief

Capital: London.
Official language: English.
Official name: United Kingdom of Great Britain and Northern Ireland.
National anthem: "God Save the Queen".
Largest cities: (1991 census)

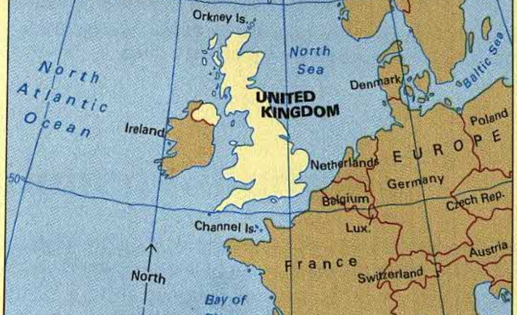
London (6,378,600)	Sheffield (500,500)
Birmingham (934,900)	Manchester (451,100)
Leeds (674,400)	Liverpool (448,300)
Glasgow (654,542)	

The United Kingdom's flag is known as the *British Union Flag* or the *Union Jack.* It was officially adopted in 1801.

Royal arms date from 1837 in their present form. The shield bears the arms of England, Ireland, and Scotland.

Land and climate

Land: In western Europe. Includes entire island of Great Britain and northeastern part of the island of Ireland. France lies across the English Channel to the south; Republic of Ireland across the Irish Sea to the west; Belgium, the Netherlands, Germany, Denmark, and Norway to the east across the North Sea. Most of the United Kingdom is flat or rolling lowland. Rugged sections lie in northern Scotland, in Wales, in the Pennines of northern England, and in far southwestern England (Cornwall).



Area: 244,177 km². *Greatest distances*—north-south, about 970 km; east-west, about 480 km. *Coastline*—4,057 km.
Elevation: *Highest*—1,343 m (Ben Nevis, in Scotland). *Lowest*—2.7 m below sea level (Great Holme Fen, near the River Ouse in Cambridgeshire).
Climate: Modified by warm Gulf Stream current from Atlantic Ocean; not as cold as most places so far north. Summers mild—daytime highs about 22 °C in south, about 18 °C in Scotland. Cool winters—nighttime temperatures drop nearly to freezing, but rarely much below, except in the colder Scottish highland areas. Precipitation moderate, generally higher in west.

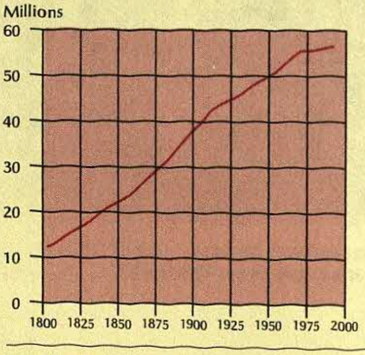
Government

Form of government: Constitutional monarchy. In practice, a parliamentary democracy.
Head of state: Monarch (queen or king).
Head of government: Prime minister.
Legislature: Parliament of two houses: 651-member House of Commons; House of Lords, about 1,170 members. House of Commons much more powerful than House of Lords.
Executive: Prime minister (chosen by House of Commons) and Cabinet.
Political subdivisions: England, Scotland, Wales, Northern Ireland—four "countries" united under one government. Each country has units of local government.

People

Population: *Estimated 1996 population*—58,784,000. *1991 census*—56,467,000. *2001 estimate*—59,800,000.
Population density: 241 people per km².
Distribution: 90% urban, 10% rural.
Major ethnic/national groups: 95% of mostly British or Irish descent. About 5% recent immigrants or their descendants. Immigrants from former British colonies in the Indian subcontinent, the Caribbean area, and eastern and southern Africa; also Chinese and people from Mediterranean Europe and the Middle East.
Major religions: About 50% Church of England, 10% Roman Catholic, 4% Presbyterian; also several other Protestant denominations, Muslims, Hindus, Jews.

Population trend



Year	Population
1801	11,944,000
1811	13,368,000
1821	15,472,000
1831	17,835,000
1841	20,183,000
1851	22,259,000
1861	24,525,000
1871	27,431,000
1881	31,015,000
1891	34,264,000
1901	38,237,000
1911	42,082,000
1921	44,027,000
1931	46,038,000
1951	50,225,000
1961	52,709,000
1971	55,515,000
1981	55,638,000
1991	56,467,000

Economy

Chief products: *Agriculture*—wool, beef cattle, milk, chickens and eggs, pigs, wheat, potatoes, barley, sugar beet. *Manufacturing*—foods and beverages, chemicals and pharmaceuticals, electrical and electronic goods, machinery, motor vehicles, textiles and clothing, printing and publishing, rubber and plastics goods, iron and steel, aerospace equipment, metal manufactures, ceramics. *Mining*—petroleum, coal, natural gas.
Money: *Currency unit*—pound sterling. One pound = 100 pence.
Gross domestic product: *1991 total GDP*—U.S. $1,018,000,000,000. *1991 GDP per capita*—U.S. $17,690.
Foreign trade: *Major exported goods*—machinery, petroleum, motor vehicles, chemicals, pharmaceuticals, scientific and medical equipment, aerospace equipment. *Value of exported goods and services*—U.S. $238,700,000,000 (1991). *Major imported goods*—machinery, foods (especially fruit, vegetables, meat, coffee, tea), motor vehicles, petroleum products, chemicals, metals, textiles, paper and newsprint, clothing. *Value of imported goods and services*—U.S. $248,500,000,000 (1991). *Main trading partners*—Germany, United States, France, Netherlands, Italy.

Highlights

London. Capital and largest city; one of the world's great cultural centres. See **London** (London in brief).

Southern England

Canterbury. Spiritual centre of Church of England. Cathedral built between 1000's and early 1500's. Destination of travellers in *Canterbury Tales* by Chaucer.

Brighton. Beach resort. Ornate Royal Pavilion, completed 1822, built as a residence for Prince Regent, now a conference centre. Exterior resembles Mughal (Muslim Indian) palace.

Southampton. Important seaport. Across a strait called the Solent from resort Isle of Wight. Nearby New Forest—woodland where wild ponies live—named by William the Conqueror in 1000's.

Winchester. Capital of England before the 1000's. Cathedral, 169 metres long, is longest in England.

Salisbury. Cathedral spire rises 123 metres.

Stonehenge (near Salisbury). Prehistoric monuments—circles of huge stones—erected more than 3,500 years ago.

Plymouth. Historic seaport. Departure and return point of Sir Francis Drake's voyage around the world (1577-1580); departure point of *Mayflower*, carrying Pilgrims to Massachusetts (1620).

Dartmoor and **Exmoor** national parks (on the southwestern peninsula north of Plymouth). Wild, rocky moorlands; forests at lower elevations.

Bath. Health spa with warm springs used since Roman times. Beautiful town architecture of the 1700's.

Bristol. Seaport, industrial city, university. Clifton suspension bridge, across the River Avon, designed by I. K. Brunel, completed in 1864. Zoo famed for breeding endangered large mammals.

Central England

Stratford-upon-Avon. Birthplace and burial place of William Shakespeare. Many structures connected with Shakespeare's life. Shakespearean theatre performances.

Cotswold Hills. Limestone hills from Bath northeast to Stratford. Attractive pastoral scenery. Traditional villages built of local stone.

Coventry. Severely bombed by German aircraft in 1940. Striking modern cathedral replaced older bombed cathedral. Town centre has statue in honour of Lady Godiva.

Birmingham. UK's chief manufacturing zone—cars, computers, electronic goods. Many high-rise buildings in city centre replace structures destroyed by bombs during World War II. One of Europe's largest city libraries.

Oxford. Oxford University, UK's oldest, gradually developed during the 1100's. Comprises about 35 colleges, including Christ Church, Magdalen (with its own deer park), Balliol, Queen's, Merton, Brasenose.

Cambridge. Cambridge University: among the colleges are King's (large chapel), Trinity (famous library), Clare. The "Backs"—peaceful back lawns of colleges along the Cam River.

Norwich. Norman castle and cathedral; busy market centre. East of Norwich lie the Norfolk Broads—natural marshes with water birds.

Northern England

Lake District National Park. Low mountains, lakes, valleys—scenery praised by English poets. Lakes include Derwentwater (near Keswick) and Lake Windermere (near Windermere). Grasmere area made famous by poet William Wordsworth.

Liverpool. Major seaport and industrial city. Two modern cathedrals—Anglican and Roman Catholic. Maritime Museum. Home of the Beatles.

Manchester. Centre of cotton textile manufacturing in the 1800's. Neo-Gothic Town Hall.

Leeds. Important manufacturing city (wool textiles and clothing, high technology industries). Major transportation centre.

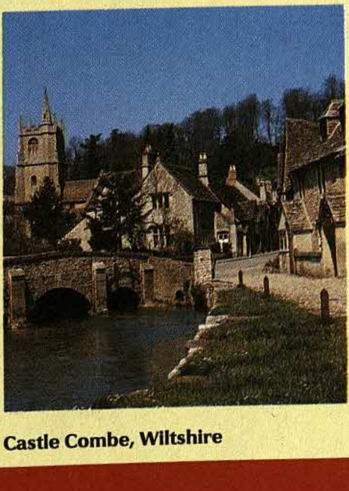
Sheffield. Iron and steel manufacturing—precision tools and cutlery. Severely polluted before 1950's, now a clean city that wins awards for garden displays.

York. Minster (cathedral)—largest Gothic cathedral in England—beautiful stained-glass windows. Several shopping areas with medieval atmosphere.

Scotland

Edinburgh. Scottish capital. Hilly city. Old Town, dating from medieval times, has grey stone public buildings. Royal Mile: Old Town street lined with historic churches and other buildings; links Edinburgh Castle with palace of Holyroodhouse. New Town: lovely planned city centre that dates from 1700's and 1800's. Annual Edinburgh International Festival in late summer.

Saint Andrews golf centre and city of Saint Andrews University, Scotland's oldest university.



Castle Combe, Wiltshire

Edinburgh Castle

Glasgow. Industrial city, seaport, largest city in Scotland. Shipbuilding centre.

Loch Lomond National Nature Reserve. Sparkling *loch* (lake) in forested setting, 32 kilometres northwest of Glasgow. Loch Lomond and the nearby Trossachs (wooded gorge) resemble the highland country farther north, yet are accessible from Glasgow.

Scottish Highlands and the Isles. Highlands covered by grass and heather; rocky shores, deep lochs, windswept islands. Few people—fishing and sheep raising—but grand scenery.

Loch Ness. Part of long, deep crack in earth's surface from Moray Firth to Firth of Lorne. Sea monster named "Nessie" said to dwell in depths of loch.

Aberdeen. Chief city of northern Scotland. Centre for North Sea oil.

Wales

Many Welsh still speak the Welsh language, maintain traditional customs. Welsh singing very popular.

Cardiff. Capital and largest city of Wales. Centre of light industry and financial services. Administrative centre of three counties. Headquarters of University of Wales. Norman castle built in 1100's on Roman fort.

Llangollen. Home of International Musical Eisteddfod, famous singing and dancing festival.

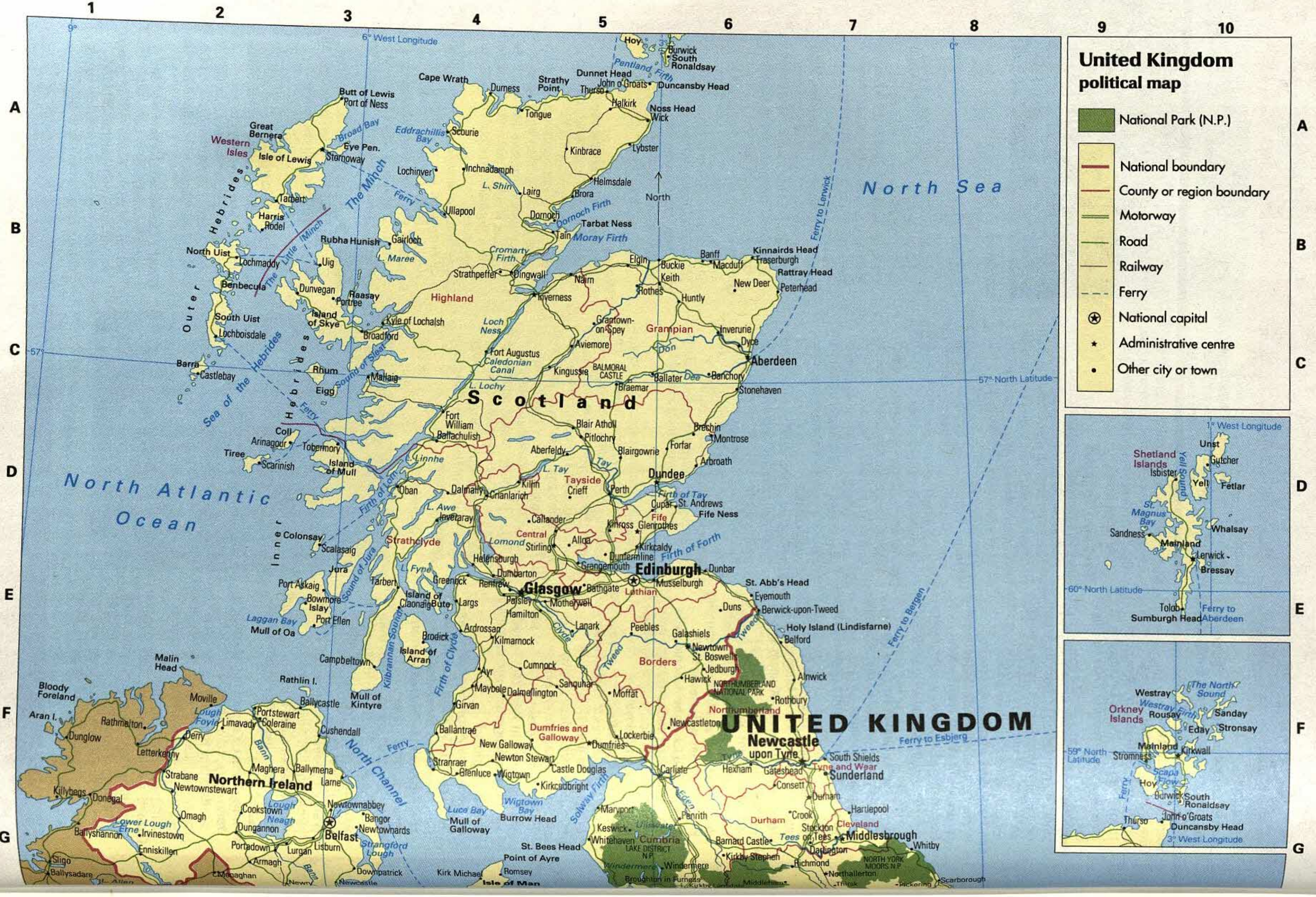
Swansea. City and industrial seaport. Birthplace of Welsh writer Dylan Thomas. Tourist centre for Gower Peninsula.

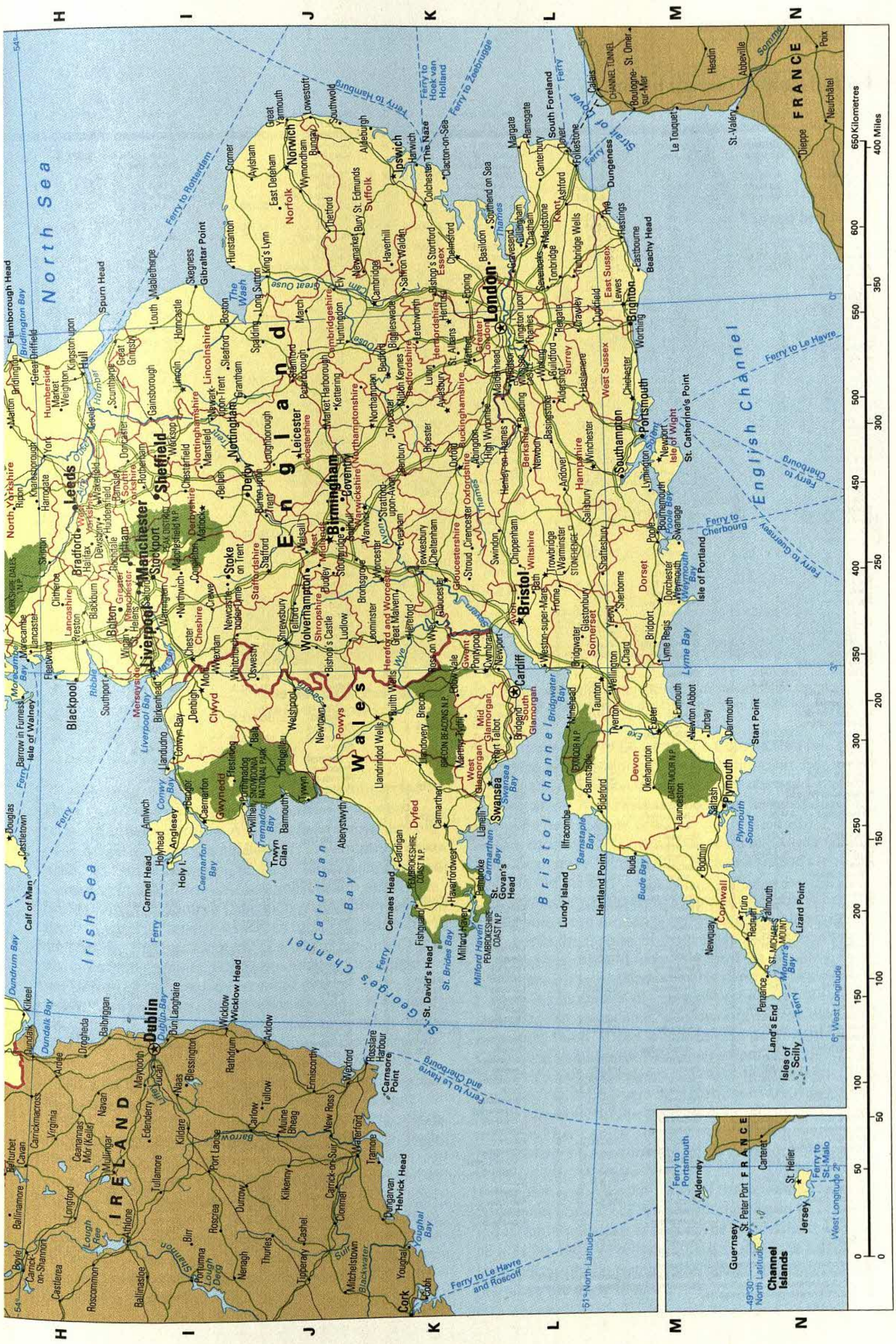
National Parks in Snowdonia, Brecon Beacons, and Pembrokeshire coast. All are areas of great scenic beauty.

Northern Ireland

Belfast. Northern Ireland capital. Industrial port and university city surrounded by hills. Stormont Castle headquarters of Northern Ireland Office. Ulster Museum and Botanical Gardens.

Giant's Causeway. Natural wonder along the north coast. Causeway formed of about 40,000 mostly hexagonal columns of basalt rock. Craggy cliffs and spectacular scenery along coast east of causeway to Ballintoy.


United Kingdom
political map
National Park (N.P.)
National boundary
County or region boundary
Motorway
Road
Railway
Ferry
National capital
Administrative centre
Other city or town
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
9°
6° West Longitude
3°
0°
57°
57° North Latitude
North Sea
North Atlantic Ocean
North
Scotland
UNITED KINGDOM
Northern Ireland
Western Isles
Outer Hebrides
Inner Hebrides
Sea of the Hebrides
The Minch
The Little Minch
Ferry
Ferry to Lerwick
Ferry to Bergen
Ferry to Esbjerg
Butt of Lewis
Port of Ness
Great Bernera
Broad Bay
Isle of Lewis
Eye Pen.
Stornoway
Tarbert
Harris
Rodel
North Uist
Lochmaddy
Benbecula
South Uist
Lochboisdale
Barra
Castlebay
Cape Wrath
Durness
Strathy Point
Dunnet Head
Thurso
John o'Groats
Duncansby Head
Hoy
Pentland Firth
Burwick
South Ronaldsay
Halkirk
Noss Head
Wick
Tongue
Eddrachillis Bay
Scourie
Kinbrace
Lybster
Lochinver
Inchnadamph
L. Shin
Lairg
Helmsdale
Brora
Dornoch
Dornoch Firth
Tarbat Ness
Ullapool
Tain
Moray Firth
Rubha Hunish
Gairloch
L. Maree
Uig
Cromarty Firth
Strathpeffer
Dingwall
Dunvegan
Raasay
Portree
Island of Skye
Highland
Inverness
Nairn
Elgin
Buckie
Keith
Banff
Macduff
Kinnairds Head
Fraserburgh
Rattray Head
New Deer
Peterhead
Rothes
Huntly
Kyle of Lochalsh
Broadford
Loch Ness
Grantown-on-Spey
Grampian
Inverurie
Dyce
Aberdeen
Don
Aviemore
Fort Augustus
Caledonian Canal
Kingussie
BALMORAL CASTLE
Ballater
Dee
Banchory
Braemar
Stonehaven
Rhum
Sound of Sleat
Mallaig
Eigg
L. Lochy
Fort William
Ballachulish
Blair Atholl
Pitlochry
Brechin
Montrose
Forfar
Blairgowrie
Arbroath
Aberfeldy
Tay
Coll
Arinagour
Tobermory
Tiree
Scarinish
Island of Mull
L. Linnhe
L. Tay
Tayside
Dundee
Killin
Crieff
Perth
Firth of Tay
Cupar
St. Andrews
Fife Ness
Firth of Lorn
Oban
Dalmally
Crianlarich
L. Awe
Inveraray
Callander
Kinross
Glenrothes
Fife
Central
Lomond
Stirling
Alloa
Kirkcaldy
Dunfermline
Firth of Forth
Colonsay
Scalasaig
Strathclyde
Helensburgh
Dumbarton
Grangemouth
Edinburgh
Dunbar
Jura
Sound of Jura
L. Fyne
Greenock
Renfrew
Glasgow
Bathgate
Lothian
Musselburgh
St. Abb's Head
Eyemouth
Port Askaig
Tarbert
Island of Cumbrae
Bute
Largs
Paisley
Motherwell
Duns
Berwick-upon-Tweed
Bowmore
Islay
Port Ellen
Hamilton
Lanark
Tweed
Laggan Bay
Mull of Oa
Ardrossan
Peebles
Galashiels
Holy Island (Lindisfarne)
Belford
Brodick
Kilmarnock
Clyde
Island of Arran
Kilbrannan Sound
Firth of Clyde
Newtown St. Boswells
Jedburgh
Campbeltown
Cumnock
Borders
Hawick
Alnwick
Malin Head
Rathlin I.
Ayr
Sanquhar
NORTHUMBERLAND NATIONAL PARK
Bloody Foreland
Moville
Ballycastle
Mull of Kintyre
Maybole
Dalmellington
Moffat
Rothbury
Aran I.
Rathmelton
Lough Foyle
Portstewart
Coleraine
Girvan
Northumberland
Limavady
Derry
Cushendall
Ballantrae
Dumfries and Galloway
Newcastleton
Dunglow
Letterkenny
Bann
Maghera
Ballymena
Larne
North Channel
New Galloway
Dumfries
Lockerbie
Newcastle upon Tyne
South Shields
Strabane
Newtownstewart
Stranraer
Newton Stewart
Castle Douglas
Carlisle
Hexham
Gateshead
Tyne and Wear
Sunderland
Killybegs
Donegal
Glenluce
Wigtown
Kirkcudbright
Solway Firth
Eden
Consett
Durham
Omagh
Cookstown
Lough Neagh
Newtownabbey
Bangor
Wigtown Bay
Maryport
Penrith
Hartlepool
Lower Lough Erne
Ballyshannon
Irvinestown
Dungannon
Belfast
Newtownards
Luce Bay
Mull of Galloway
Burrow Head
Keswick
Ullswater
Cumbria
Crook
Durham
Stockton on Tees
Tees
Cleveland
Middlesbrough
Whitehaven
LAKE DISTRICT N.P.
Barnard Castle
Enniskillen
Portadown
Lurgan
Lisburn
Strangford Lough
St. Bees Head
Darlington
Whitby
Sligo
Armagh
Point of Ayre
Windermere
Kirkby Stephen
Richmond
NORTH YORK MOORS N.P.
Ballysadare
Monaghan
Newry
Downpatrick
Kirk Michael
Ramsey
Broughton in Furness
Northallerton
Scarborough
Newcastle
Isle of Man
Thirsk
Pickering
Middleham
Shetland Islands
1° West Longitude
Unst
Gutcher
Yell Sound
Isbister
Yell
Fetlar
St. Magnus Bay
Sandness
Mainland
Whalsay
Lerwick
Bressay
60° North Latitude
Tolob
Sumburgh Head
Ferry to Aberdeen
Orkney Islands
Westray
The North Sound
Westray Firth
Rousay
Sanday
Eday
Stronsay
59° North Latitude
Stromness
Mainland
Kirkwall
Scapa Flow
Hoy
Burwick
South Ronaldsay
Ferry
Thurso
John o'Groats
Duncansby Head
3° West Longitude


North Sea
Irish Sea
English Channel
Bristol Channel
St. George's Channel
Cardigan Bay
Strait of Dover
England
Wales
IRELAND
FRANCE
London
Birmingham
Manchester
Liverpool
Leeds
Sheffield
Bristol
Cardiff
Dublin
Nottingham
Leicester
Coventry
Wolverhampton
Stoke on Trent
Derby
Bradford
Southampton
Portsmouth
Plymouth
Swansea
Norwich
Ipswich
Brighton
Cambridge
Oxford
Hull
York
Lincolnshire
Norfolk
Suffolk
Essex
Kent
Surrey
East Sussex
West Sussex
Hampshire
Isle of Wight
Dorset
Devon
Cornwall
Somerset
Wiltshire
Gloucestershire
Oxfordshire
Berkshire
Buckinghamshire
Hertfordshire
Bedfordshire
Cambridgeshire
Northamptonshire
Leicestershire
Warwickshire
West Midlands
Staffordshire
Shropshire
Hereford and Worcester
Cheshire
Derbyshire
Nottinghamshire
South Yorkshire
West Yorkshire
North Yorkshire
Humberside
Lancashire
Greater Manchester
Merseyside
Greater London
Avon
Gwent
Mid Glamorgan
South Glamorgan
West Glamorgan
Dyfed
Powys
Gwynedd
Clwyd
Isle of Man
Douglas
Castletown
Calf of Man
Anglesey
Holy I.
Holyhead
Lundy Island
Isles of Scilly
Land's End
Lizard Point
Start Point
Hartland Point
St. David's Head
Beachy Head
South Foreland
Flamborough Head
Spurn Head
Gibraltar Point
St. Catherine's Point
Isle of Portland
Snowdonia National Park
Brecon Beacons N.P.
Pembrokeshire Coast N.P.
Exmoor N.P.
Dartmoor N.P.
Peak District N.P.
Yorkshire Dales N.P.
Channel Tunnel
Ferry to Rotterdam
Ferry to Hamburg
Ferry to Hoek van Holland
Ferry to Zeebrugge
Ferry to Le Havre
Ferry to Cherbourg
Ferry to Guernsey
Ferry to Le Havre and Cherbourg
Ferry to Le Havre and Roscoff
Ferry
Thames
Severn
The Wash
Humber
Solent
Calais
Boulogne-sur-Mer
Dieppe
Le Touquet
Abbeville
St. Omer
Somme
Cork
Waterford
Wexford
Rosslare Harbour
Carnsore Point
Shannon
Channel Islands
Guernsey
St. Peter Port
Jersey
St. Helier
Alderney
Ferry to Portsmouth
Ferry to St.-Malo
Carteret
51° North Latitude
49°30' North Latitude
6° West Longitude
2° West Longitude
0°
H
I
J
K
L
M
N
0
50
100
150
200
250
300
350
400 Miles
650 Kilometres

United Kingdom map index

Political divisions

Name	Population	Area In km²	Capital
England	47,078,000	130,478	London
Northern Ireland	1,578,000	14,144	Belfast
Scotland	4,999,000	78,789	Edinburgh
Wales	2,812,000	20,768	Cardiff

Cities and towns**

Aberdare (Cynon Valley District)*	63,600	K	5
Aberdeen	201,099	C	6
Abergavenny (Monmouth District)	75,000	K	5
Aberystwyth		J	5
Airdrie (Monklands District)*	101,151	E	5
Allerdale*	96,300	G	5
Amlwch		I	4
Antrim*	44,264	G	3
Arbroath (Angus District)	92,881	D	6
Ards*	64,006	G	3
Armagh	51,287	G	2
Arnold (Gedling District)*	107,600	I	7
Ashford	90,900	L	9
Aylesbury	143,600	K	8
Ayr (Kyle and Carrick District)	113,572	F	4
Ballantrae		F	4
Ballycastle		F	3
Ballymena	55,916	F	3
Banbridge*	33,144	G	3
Banbury		K	7
Banff		B	6
Bangor		G	3
Barnsley	217,300	H	7
Barnstaple		L	4
Barrow-in-Furness	71,900	H	5
Barry (Vale of Glamorgan District)*	110,700	L	5
Basildon	157,500	K	9
Basingstoke [and Deane]	140,400	L	7
Bath	79,900	L	6
Bearsden* [and Milngavie]	39,522	E	5
Bedford (North Bedfordshire District)	132,100	K	8
Belfast	280,972	G	3
Belford		E	6
Benfleet (Castle Point District)*	84,200	L	9
Birkenhead (Wirral District)	332,100	I	5
Birmingham	934,900 †2,500,400	J	7
Blackburn	132,800	H	6
Blackpool	144,500	H	5
Blyth	78,000	F	7
Bognor Regis (Arun District)*	127,700	M	8
Bolton	253,300	H	6
Boston	52,600	I	8
Bournemouth	154,400	M	7
Bracknell*	93,800	L	8
Bradford	449,100	H	7
Braemar		C	5
Braintree	115,700	K	9
Breckland*	105,200	J	9
Brentwood	68,600	K	9
Bridlington		H	8
Brighton	133,400	M	8
Bristol	370,300	L	6
Broadland*	104,500	J	9
Brodick		E	4
Bromsgrove	89,800	J	6
Broxtowe*	104,600	I	7
Burnley*	89,000	H	6
Bury*	172,200	H	6
Bury St. Edmunds (St. Edmundsbury District)	89,100	J	9
Caernarfon		I	4
Caerphilly (Rhymney Valley District)*	101,400	L	5
Camborne (Carrick District)*	82,700	N	3
Cambridge	101,000	K	8
Cannock [and Chase]	87,400	J	6
Canterbury	127,100	L	9
Cardiff	272,600	L	5
Cardigan		K	4
Carlisle	99,800	F	6
Carmarthen	54,800	K	4
Carrickfergus*	32,299	G	3
Castlereagh*	60,720	G	3
Charnwood*	140,500	J	7
Chelmsford	150,000	K	9
Cheltenham	85,900	K	6
Cherwell*	115,900	K	7
Chester	115,000	I	6
Chesterfield	99,700	I	7
Chichester	100,300	M	8
Chiltern*	88,700	K	8
Chorley*	96,500	H	6
Christchurch	40,500	M	7
Clacton-on-Sea (Tendring District)	125,100	K	9
Cleethorpes*	67,500	I	8
Clydebank*	44,658	E	5
Colchester	141,100	K	9
Coleraine	51,060	F	2
Colwyn Bay	54,600	I	5
Cookstown	30,883	G	2
Corby	52,300	J	8
Coventry	292,600	J	7
Craigavon*	74,350	G	3
Crawley	87,100	L	8
Crewe (and Nantwich)	101,800	I	6
Cumbernauld* (and Kilsyth)	61,042	E	5
Cumnock		E	4
Cunninghame*	134,676	E	4
Cwmbran (Torfaen District)	88,200	K	6
Dacorum*	129,200	K	8
Darlington	96,700	G	7
Dartford*	78,400	L	9
Derby	214,000	I	7
Derry	94,721	F	2
Derwentside*	84,800	F	7
Doncaster	284,300	I	7
Dorchester		M	6
Douglas		H	4
Dover	102,600	L	10
Down*	57,503	G	3
Dudley	300,400	J	6
Dumbarton	75,973	E	4
Dumfries (Nithsdale District)	56,616	F	5
Dunbar		E	6
Dundee	165,548	D	5
Dunfermline	125,529	E	5
Dungannon	45,408	G	2
Duns		E	6
Dunstable (South Bedfordshire District)*	106,800	K	8
Durham	85,000	G	6
Dunvegan		B	3
Easington*	96,300	G	7
East Hertfordshire*	114,200	K	8
East Kilbride	81,399	E	5
Eastbourne	83,200	M	9
Eastleigh*	103,200	L	7
Ebbw Vale (Blaenau Gwent District)	74,400	K	5
Edinburgh	421,213	E	5
Ellesmere Port (and Neston)*	78,800	I	6
Epping	113,100	K	8
Epsom [and Ewell]*	66,000	L	8
Erewash*	104,400	I	7
Esher (Elmbridge District)*	109,900	L	8
Exeter	101,100	M	5
Falkirk*	139,038	E	5
Fareham*	97,300	M	7
Fenland*	72,900	J	8
Fermanagh*	51,400	G	1
Folkestone (Shepway District)	89,200	L	9
Fort William		C	4
Galashiels		E	6
Gateshead	196,500	F	7
Gillingham	93,300	L	9
Girvan		F	4
Glasgow	654,542	E	4
Glastonbury		L	6
Glenrothes		D	5
Gloucester	91,800	K	5
Gosport	72,800	M	7
Grangemouth		E	5
Grantham (South Kesteven District)	107,200	I	8
Gravesend (Gravesham District)*	90,000	L	9
Great Grimsby, see Grimsby			
Great Malvern, (Malvern Hills District)	87,000	K	6
Great Yarmouth	85,900	J	10
Greenock (Inverclyde District)	88,054	E	4
Grimsby	88,900	H	8
Guildford	121,500	L	8
Halifax (Calderdale District)	187,300	H	6
Haltemprice (Beverley District)*	109,500	H	8
Halton*	121,400	I	6
Hamilton	103,139	E	5
Harlow	73,500	K	9
Harrogate	141,000	H	7
Hartlepool	88,200	G	7
Hastings	78,100	M	9
Havant*	117,400	M	7
Haverhill		K	9
Hawick		F	6
Helmsdale		A	5
Henley-on-Thames		L	7
Hereford	49,800	K	6
High Wycombe	154,500	K	7
Hinckley (and Bosworth)*	93,600	J	7
Hitchin (North Hertfordshire District)*	108,600	K	8
Horsham	107,300	L	8
Hove	82,500	M	8
Huddersfield (Kirklees District)	367,600	H	7
Hull (Kingston upon Hull)	252,200	H	8
Huntingdon	140,700	J	8
Inverness	62,647	B	4
Inverurie		C	6
Ipswich	115,500	K	9
Kerrier*	86,400	N	3
Kettering	75,200	J	8
Kilmarnock [and Loudoun]	78,558	E	4
King's Lynn (and West Norfolk)	128,400	J	9
Kingston upon Hull, see Hull			
Kingswood*	87,100	L	6
Kingussie		C	5
Kinross		D	5
Kirkcaldy	144,574	E	5
Kirkintilloch (Strathkelvin District)*	83,616	E	5
Kirkwall		F	10
Knowsley*	149,100	I	6
Kyle of Lochlash		C	3
Lancaster	125,600	H	6
Langbaurgh*	141,700	G	7
Larne	29,280	F	3
Leeds	674,400 †1,984,700	H	7
Leicester	270,600	J	7
Leominster		K	6
Lerwick		D	10
Lichfield	90,700	J	7
Limavady*	29,144	F	2
Lincoln	81,900	I	8
Lisburn	98,826	G	3
Liverpool	448,300 †1,376,800	I	6
Llandovery		K	5
Llanelli	73,500	K	4
Lockerbie		F	5
London (Greater London)	6,378,600	L	8
Louth		I	8
Lowestoft (Waveney District)	105,500	J	10
Ludlow		J	6
Luton	167,300	K	8
Lymington (New Forest District)	157,000	M	7
Macclesfield	147,000	I	6
Maidstone	133,200	L	9
Mallaig		C	3
Manchester	397,400 †2,445,200	I	6
Mangotsfield (Northavon District)*	129,600	L	6
Mansfield	98,800	I	7
Margate (Thanet District)	121,700	L	10
Matlock (Amber Valley District)*	109,700	I	7
Merthyr Tydfil	59,300	K	5
Mid Sussex*	118,800	L	8
Middlesbrough	141,100	G	7
Milford Haven (Preseli District)	69,600	K	4
Milton Keynes	172,300	K	8
Montrose		D	6
Motherwell	140,320	E	5
Musselburgh		E	5
Neath*	64,100	K	5
Newark-upon-Trent		I	8
Newbury	136,400	L	7
Newcastle-under-Lyme	117,400	I	6
Newcastle upon Tyne	263,000 †1,087,000	F	7
Newport	129,900	L	6
Newport		M	7
Newry [and Morne]	82,237	G	3
Newtown St. Boswells		E	6
Newtownabbey	73,718	G	3
North Bedfordshire*	132,100	K	7
North Down*	70,065	G	3
North Tyneside*	188,800	F	7
Northallerton		G	7
Northampton	178,200	J	7
Norwich	121,000	J	9
Nottingham	261,500	I	7
Nuneaton [and Bedworth]	115,300	J	7
Ogwr*	130,500	L	5
Oldham	211,400	I	6
Omagh	45,568	G	2
Oxford	109,000	K	7
Paisley (Renfrew District)	193,622	E	4
Perth [and Kinross]	126,842	D	5
Peterborough	148,800	J	8
Peterhead		B	6
Plymouth	238,800	M	4
Pontypridd (Taff-Ely District)*	95,400	K	5
Poole	130,900	M	7
Port Talbot (Afan District)	49,900	L	5
Portsmouth	174,700	M	7
Potters Bar (Hertsmere District)	86,100	K	8
Preston*	126,200	H	6
Reading	122,600	L	7
Redditch	76,900	J	7
Reigate [and Banstead]	114,900	L	8
Restormel*	88,300	M	4
Rhondda*	76,300	K	5
Rochdale*	196,900	H	6
Rochester [upon Medway]*	142,000	L	9
Rotherham	247,100	I	7
Rugby	83,400	J	7
St. Albans	122,400	K	8
St. Andrews		D	6
St. Helens	175,300	I	6
St. Peter Port		N	1
St. Helier		N	1
Salford*	217,900	I	6
Salisbury	103,200	L	7
Sandwell*	282,000	J	6
Scarborough	107,800	G	8
Scourie		A	4
Scunthorpe	60,500	H	8
Seaham (Easington District)*	96,300	F	7
Sedgefield*	89,200	G	7
Sevenoaks	106,100	L	9
Sheffield	500,500 †1,249,300	I	7
Shrewsbury [and Atcham]	90,900	J	6
Slough	98,600	L	8
Solihull	195,100	J	7
South Lakeland*	101,900	G	6
South Oxfordshire*	130,900	L	7
South Shields (South Tyneside District)	151,900	F	7
Southampton	194,400	M	7
Southend-on-Sea	153,700	L	9
Southport (Sefton District)	282,000	H	5
Southwold		J	10
Spalding		J	8
Spelthorne*	87,100	L	8
Stafford	117,000	J	6
Stevenage	73,700	K	8
Stirling	81,717	E	5
Stamford		J	8
Stockport	276,800	I	6
Stockton-on-Tees	170,200	G	7
Stoke-on-Trent	244,800	I	6
Stonehaven		C	6
Stornoway		A	3
Strabane	35,711	F	2
Stranraer		F	4
Stratford-upon-Avon	103,600	K	7
Stroud	108,300	K	6
Sunderland	286,800	F	7
Sutton in Ashfield (Ashfield District)	106,800	I	7
Swale	113,700	L	9
Swansea	182,100	L	4
Swindon (Thamesdown District)	167,200	L	7
Tain		B	5
Tameside*	211,700	I	6
Tamworth	68,900	J	7
Tarbert		B	3
Taunton [Deane]	93,300	L	5
Teignbridge*	107,100	M	5
Telford		J	6
Test Valley*	99,000	L	7
Thurrock*	124,300	L	9
Thurso		A	5
Tobermory		D	3
Tonbridge [and Malling]	99,100	L	9
Torbay	122,500	M	5
Trafford*	205,700	I	6
Truro		M	4
Tunbridge Wells	98,300	L	9
Vale of White Horse*	109,200	K	7
Vale Royal*	111,100	I	6
Wakefield	306,300	H	7
Walsall	255,600	J	6
Warrington	179,500	I	6
Warwick	114,900	J	7
Watford	72,100	K	8
Waverley*	111,500	L	8
Wealdon*	127,700	L	8
Wellingborough	66,100	J	8
Welshpool		J	5
Welwyn Garden City (Welwyn Hatfield District)	91,600	K	8
Weston-super-Mare (Woodspring District)	174,300	L	6
Weymouth [and Portland]	61,000	M	6
Whitchurch		I	6
Wick		A	5
Wigan	301,900	I	6
Winchester	95,700	L	7
Windsor [and Maidenhead]	128,700	L	8
Woking	84,000	L	8
Wolverhampton	239,800	J	6
Worcester	81,000	K	6
Worksop (Bassetlaw District)*	103,000	I	7
Worthing	94,100	M	8
Wrekin, The*	137,100	J	6
Wrexham (Wrexham Maelor District)	113,600	I	6
Wychavon*	99,800	K	6
Wyre*	99,700	H	5
Wyre Forest*	93,400	J	6
Yeovil	139,400	L	6
York	100,600	H	7

*Does not appear on map; key shows general location.

†Population of metropolitan area, including suburbs.

**Populations are for districts, which may include some rural area as well as the city or town. The British government does not report populations for individual cities and towns.

Sources: 1991 census preliminary figures.

The Houses of Parliament, the meeting place of the United Kingdom's lawmakers, stand along the River Thames in London. World-famous Big Ben booms out the time from the Clock Tower.

Government

The United Kingdom is a constitutional monarchy. The head of state is Queen Elizabeth II. The queen reigns, but does not rule. A *Cabinet* of government officials, called *ministers,* actually rules the country. These ministers normally belong to the political party that has a majority in the *House of Commons,* which dominates *Parliament,* the country's lawmaking body. They are responsible to Parliament, which, in turn, is responsible to the people. This section provides an outline of the UK's system of government. For more detailed information, see **United Kingdom, Government of the.**

The Constitution of the United Kingdom is not one document, as are the constitutions of many other countries. Much of it is not even in writing, and so the country is often said to have an *unwritten constitution.*

Some of the written parts of the Constitution come from laws passed by Parliament. Some written parts come from such old documents as *Magna Carta,* which limited the king's power (see **Magna Carta**). Other written parts come from *common law,* a body of laws based on people's customs and beliefs, and supported in the courts (see **Common law**).

The unwritten parts of the Constitution include many important ideas and practices that the people have developed over the years. They include the Cabinet system of government and the relationship between the Cabinet and the monarch.

For more than 1,000 years, the Constitution has been changing and developing. It is still changing, because it is so flexible. The Constitution can be changed at any time by an act of Parliament or by the people's acceptance of a new idea or practice.

The monarchy is over 1,000 years old. Queen Elizabeth II can trace her ancestry back to England's earliest kings in the 800's.

The throne passes from a king or queen to his or her oldest son. If the monarch has no son, the oldest daughter inherits the throne. She becomes *queen regnant* (reigning queen), and has all the powers of a king.

The crown symbolizes the British monarch's supreme power. For hundreds of years, the monarch held most authority. But as Parliament's power grew, the monarch's power declined. Today, almost all the powers of the Crown are used by various government officials in the monarch's name. Elizabeth can make few decisions on her own. Yet the powers of government are referred to as *her* powers, and are used by *her* ministers, *her* Parliament, and *her* courts. The British call their government *Her Majesty's Government,* and government officials work *On Her Majesty's Service.*

Parliament makes the laws of the United Kingdom. Parliament consists of the queen, the House of Commons, and the House of Lords. The queen must approve all bills passed by Parliament before they can become laws. Although the queen may reject a bill, no monarch has since the early 1700's.

The prime minister is usually the leader of the political party that has the most seats in the House of Commons. The monarch appoints the prime minister after each general election. The monarch asks the prime minister to form a *government*—that is, to select ministers to head governmental departments and to hold various offices. The prime minister selects about 100 ministers. From them, the prime minister picks a special group to make up the Cabinet.

The Cabinet decides what the government shall do and how it shall be done. The prime minister chairs the Cabinet, which usually consists of about 20 ministers.

Her Majesty's Loyal Opposition is the largest political party in the House of Commons that opposes the party in power. The head of the opposing party is the *leader of the Opposition.*

Political parties are necessary to the United Kingdom's system of government. Each party offers voters rival policies and methods. Any number of parties may be represented in Parliament. But most people usually vote for one of the major political parties.

The chief political parties in the UK today are the Conservative Party and the Labour Party. Broadly speaking, they have appealed to two classes of people. The Conservative Party has been supported by wealthy people as well as professional people and farmers. The Labour Party has been supported by skilled and unskilled workers, especially union members. But these divisions are not so rigid as they once were. There are millionaires who vote for the Labour Party, and coal miners who support the Conservatives.

Queen Elizabeth II and her husband, Prince Philip, *left,* attend the annual Highland Games—a festival of athletics, dancing, and piping contests—in Braemar, Scotland.

The United Kingdom also has several smaller political parties. For many years, the Liberal Party was the Conservative Party's chief opponent. The Liberal Party developed from the Whigs, a group that opposed the Tories in the 1600's and 1700's. The 1922 election reduced the Liberal Party to a third party. In 1981, a number of members of Parliament who belonged to the moderate wing of the Labour Party resigned from that party and established the Social Democratic Party. The Social Democratic Party and the Liberal Party formed an alliance. Each party supported candidates of the other party in elections. In addition, the two parties worked together for common goals in Parliament. In 1988, the two parties officially merged and became the Social and Liberal Democratic Party, which in 1990 changed its name to the Liberal Democrats. Other parties include nationalist parties in Northern Ireland, Scotland, and Wales. These parties seek independence from the United Kingdom for their countries. See **Conservative Party; Labour Party; Liberal Democrats; Liberal Party; Social Democratic Party; Tory Party; Whig Party.**

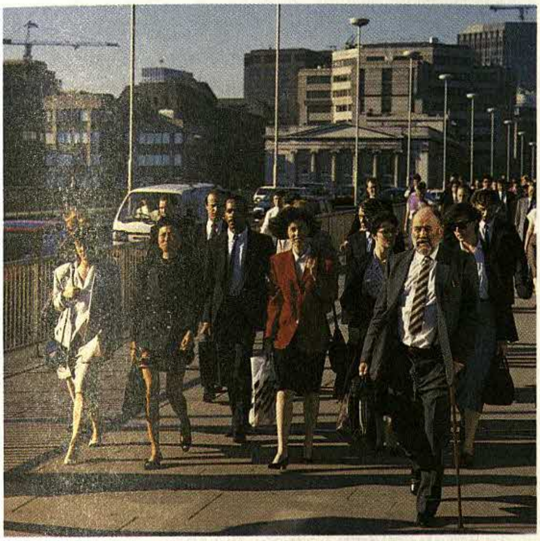
The civil service is a large group of workers called *civil servants,* who staff the departments of the national government. Civil servants help department ministers form policies, and then carry out these policies. Most civil servants are hired on the basis of tests and interviews. Their jobs range from messengers up to administrators. The Civil Service helps provide stability when the government changes, because civil servants keep their jobs no matter which party is in power. See **Civil Service.**

Law courts of the United Kingdom operate under three separate legal systems—one for England and Wales, one for Northern Ireland, and one for Scotland. The system in Northern Ireland resembles that of England and Wales. Scotland's system differs in many ways from the other two. But all the systems have some features in common. In each, some courts hear only criminal cases and other courts handle only civil cases—that is, cases involving disputes between people. Decisions made by lower courts may be appealed to higher courts. See **United Kingdom, Legal systems of the.**

Local government. The main local government units of England and Wales are counties and districts. Northern Ireland is divided into districts. Scotland is divided into regions and divisions called island areas. The regions are divided into districts.

Most governmental units have their own elected councils. The councils deal with such matters as education, public health, and police and fire protection. Local governments collect a local tax, which is either a *community charge* (poll tax) or *rates* (property tax), but about two-fifths of the local governments' income comes from the national government. See **United Kingdom, Government of the** (Local government).

The Commonwealth of Nations is an association of independent countries and their dependencies. The Commonwealth succeeded the British Empire. The United Kingdom is the heart of the Commonwealth, but has no special powers over its former colonies. All the



British people are descended from many ethnic groups. These people are London office workers.

independent states are free and equal partners. For a discussion of the Commonwealth and its development, see **Commonwealth of Nations.**

Armed services of the United Kingdom are made up of volunteers. The four services are the Royal Navy, the Royal Marines, the British Army, and the Royal Air Force. See **United Kingdom, Armed services of the.**

People

The British people are bound together by many ties of government and history. They provided an unforgettable example of unity during World War II, when they stood alone against Nazi Germany for over a year. In normal times, the people usually think of themselves as English, Irish, Scottish, or Welsh—rather than as British.

There are many divisions in British life. For example, Scotland and England each has its own national church. There are separate legal and educational systems in England and Wales, in Northern Ireland, and in Scotland. See the articles **United Kingdom, Legal systems of the; United Kingdom, Educational systems of the.** Although all the British share certain customs and traditions, each country has its own cherished ones. For a discussion of these customs and traditions, and for more information on the divisions in British life, see the articles on **England; Northern Ireland; Scotland;** and **Wales.**

Population and ancestry. The United Kingdom is more thickly populated than most countries. It has an average of 236 **people per square kilometre.**

For the total population, see the *United Kingdom in brief* table with this article. About nine-tenths of the people live in cities and towns. About 35 per cent of the urban residents live in England's seven metropolitan areas. Greater London, the largest metropolitan area, has about 6½ million people, which is over 10 per cent of the United Kingdom's total population. The six other metropolitan areas are listed below, with the largest city of each area shown in parentheses: Greater Manchester (Manchester), Merseyside (Liverpool), South Yorkshire (Sheffield), Tyne and Wear (Newcastle upon Tyne), West Midlands (Birmingham), and West Yorkshire (Leeds). See the cities that are listed in the *Related articles* at the end of this article, and at the end of the articles on **England; Northern Ireland; Scotland; and Wales.**

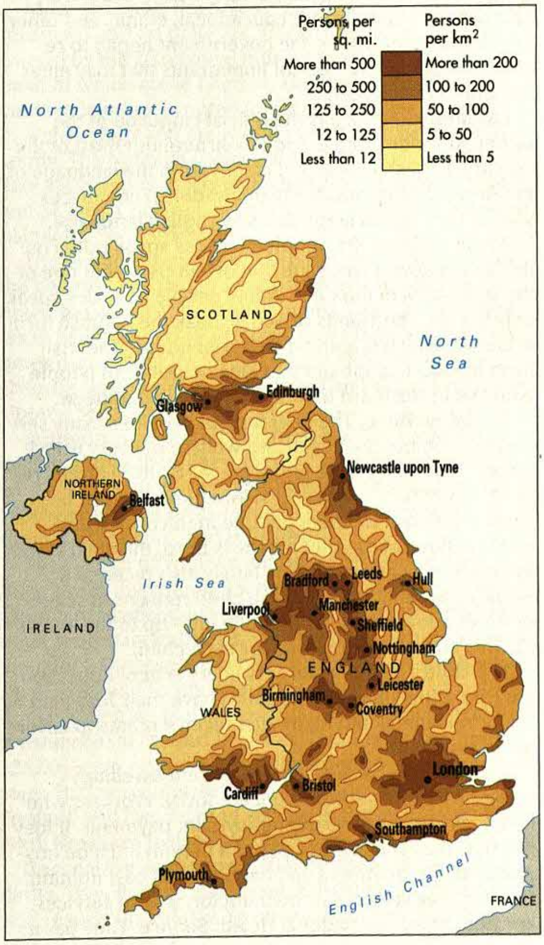
About 48 million people, or more than four-fifths of the British population, live in England. London and England as a whole have an enormous influence over the rest of the United Kingdom because of their large populations.

Most of the British are descendants of many early peoples who invaded Britain. These people included the Celts, Romans, Angles, Saxons, Scandinavians, and Normans. It is difficult to tell which of these peoples are most important in the ancestry of the British.

Since the late 1940's, many immigrants from Commonwealth countries have settled in the United Kingdom. Most of them came from the West Indies, Asia, and Africa. Today, most of Britain's immigrants live

Population density

The UK's most densely populated areas are the southeast of England (including London), and the industrial regions of central England. The Highlands of Scotland have the fewest people.



Asian immigrants from Commonwealth countries have settled in most of the United Kingdom's industrial cities.

in crowded parts of such industrial cities as London, Birmingham, Wolverhampton, Leicester, and Bradford. This has created housing, educational, ethnic, and other problems. In the 1960's, the government began to restrict sharply the number of immigrants that may enter the country each year.

Language. English is the official language of the United Kingdom, and is spoken throughout most of the country. English developed chiefly from the language of the Angle, Saxon, and Norman invaders. For a discussion of the English language, see **English language.**

About a fifth of the people of Wales speak both English and *Welsh,* a language that developed from one of the languages of the Celts. A few people of Wales speak only Welsh. Thousands of Scots speak the Scottish form of *Gaelic,* which is another Celtic language. The Irish form of Gaelic is spoken by a small number of people who live in Northern Ireland. See **Gaelic language.**

Social welfare. The government provides many services to promote the health and welfare of every British citizen "from the cradle to the grave." British citizens receive government aid even before they are born because expectant mothers get free medical care and weekly allowances. After a baby is born, the child's family receives a cash grant. The family also receives a weekly payment as long as the child remains at school or holds a low-paying apprentice job—up to the age of 19. This *child benefit* is paid for each child.

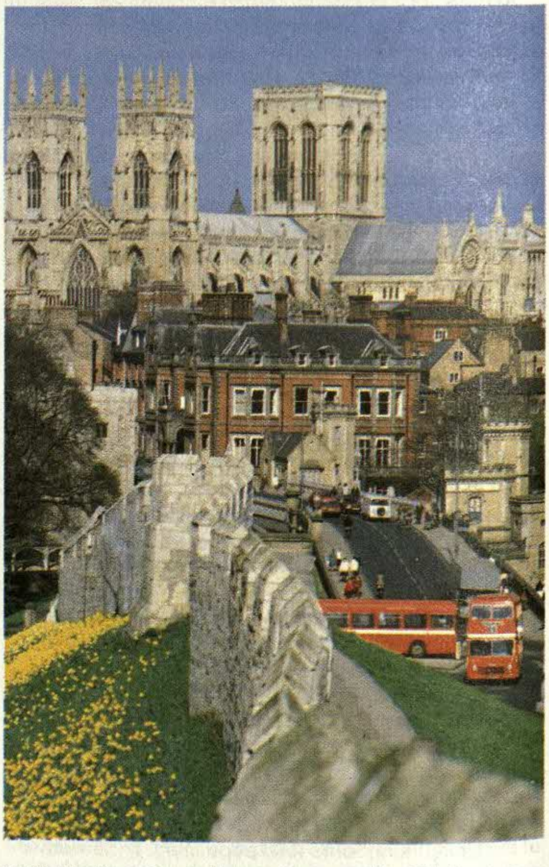
The child's primary and secondary school education are free. Most university students have their fees paid by the government, and many also receive grants to cover living expenses.

Many British citizens live in low-rent dwellings owned by a local government authority. Workers who lose their jobs receive unemployment payments. If they get sick, they receive sick pay. If a person must be hospitalized, the treatment and confinement cost nothing. Citizens may select their own doctor, whose services are free under the National Health Service. They pay a fee for some items, including dental examination and treatment, eye examinations, and glasses. These items are free for young children. People may also pay for private medical treatment. After workers retire, they receive pensions. Families of workers who die receive cash death grants and pensions.

All these services cost billions of pounds a year. About a fourth of the money comes from contributions paid by workers, employers, and self-employed and nonemployed people. The nonemployed people include those with an income above an amount set by the government. Most of the rest of the money for these services comes from taxes.

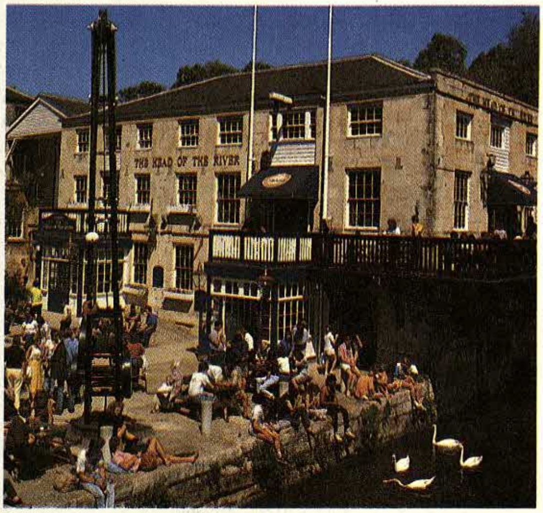
Education. The United Kingdom has three systems of state education—one for England and Wales, one for Northern Ireland, and one for Scotland. Each system is run by its own department of education, which works closely with local elected education authorities. In 1990, a national curriculum was introduced in schools in England and Wales to ensure that pupils are taught certain basic facts and skills.

All British children between the ages of 5 and 16 are required by law to go to school. Generally, pupils attend primary school until they are 11 years old, and then they go on to secondary school. There are several types of secondary schools. Some students go to *grammar schools,* which provide a preparatory education for



York Minster, regarded by many as one of the UK's finest cathedrals, dominates views from York's old city walls.

Soccer is by far the United Kingdom's most popular team sport. The players in this match are from two rival Scottish teams, Celtic and Rangers of Glasgow.



Public houses are found throughout the UK. Friends meet in pubs to relax by enjoying a drink and a chat. This summer scene, *above,* is at a riverside pub in Oxford.

university. Some attend schools that stress a more general, technical, or vocational education. However, most students attend *comprehensive schools,* which provide all types of secondary school education.

Most schools in the state system are free. About 95 per cent of all schoolchildren attend primary and secondary schools supported by public funds. The rest go to *independent schools.* The independent schools are private schools supported by fees paid by parents, and by private gifts of money. There are several types of independent schools. The most famous of them are the English *public schools,* which provide a secondary school education. Although they are private schools, they are called public because the earliest of these schools were established for poor children.

The United Kingdom has 86 universities. The government tries to see that any student who has the ability to get a university education has the opportunity to do so. More than 90 per cent of students at universities have all or part of their educational expenses paid from public or private funds.

Before 1992, colleges called *polytechnics* offered courses of higher education in science, social studies, and other fields. But polytechnics did not have the same status as universities. In 1992, the government reclassified polytechnics as universities.

Oxford University was founded in the 1100's, and Cambridge University was founded in the 1200's. They have a greater reputation than other universities because of their age, traditions, and high standards of scholarship. The University of London is the United Kingdom's largest university. For the enrolments of these universities, see **Cambridge University; London, University of; Oxford University.**

In addition to the universities, the United Kingdom has many colleges that specialize in art, business studies, teacher training, and technical subjects. For more information on education in the UK, see the article **United Kingdom, Educational systems of the;** and the *Education* section of the articles on **England; Northern Ireland; Scotland;** and **Wales.**

Museums and libraries. The UK has more than 1,000 museums and art galleries. The largest collections are owned by the 20 national museums and art galleries, most of which are in London. The British Museum, located in London, is noted for its outstanding collections in archaeology and many other fields (see **British Museum**). The National Gallery, also in London, and the Tate Gallery, which has collections in London, Liverpool, and St. Ives, Cornwall, have some of the world's greatest paintings. See **Museum.**

The public library system serves people throughout the country. The nation's largest library, the British Library, has about 15 million volumes. The national libraries of Scotland and Wales have more than 2 million volumes each. Other important British libraries include Oxford's Bodleian Library and the Cambridge University Library. See **Library.**

Religion. The United Kingdom has two *established* (national) churches. They are the Church of England, which is Episcopal, and the Church of Scotland, which is Presbyterian. The British monarch must belong to the Church of England, and is its head.

The Church of England has about 27 million members, and is the country's largest religious body. The Church of Scotland has about 2 million members. The other Protestant churches have a total of about 2 million members. Of these churches, the largest are the Baptist, Methodist, and United Reformed. More than $5\frac{1}{2}$ million Roman Catholics live in the UK. The Muslim population is estimated at around 1 million. There are also about 325,000 Jews, one of the largest groups of Jews in Europe. For more information on religion, see **Church of England** and the *Religion* section of the articles on **England; Northern Ireland; Scotland;** and **Wales.**

Recreation and sports. The British love the outdoors. They flock to Blackpool, Brighton, and other seaside resorts on holiday. Several million holidaymakers

The United Kingdom has more than 1,000 museums and galleries. A restored watermill, *above,* is one attraction at the Ulster Folk Museum at Cultra, in Northern Ireland.

visit Spain, Greece, France, and other countries. Other holidaymakers prefer mountain climbing in Wales or in the beautiful Lake District of northwestern England. Still others enjoy car or bicycle trips through the country. The British also spend much time in their gardens. About half of the UK's families have a garden.

The British are enthusiastic sports fans. The most popular team sport by far is soccer, which the British call football. During the soccer season, thousands of fans pack the stadiums every Saturday. Cricket is often called England's national game. Schools, universities, and almost all towns and villages have cricket teams. Other popular sports include angling, golf, hockey, horse riding, horse racing, Rugby League and Rugby Union football, sailing, snooker, and tennis.

Gambling on sports events has almost become a sport in itself in the UK. About 75 per cent of the adults gamble—at least occasionally—on horse races, dog races, or soccer games. Betting shops and bingo halls are also popular. For more information on recreation, see the *Recreation* section in the articles on **England; Northern Ireland; Scotland;** and **Wales.**

The arts. The countries that make up the United Kingdom have long traditions in the arts. For details on the development of the arts, see the article **United Kingdom, Arts of the;** and the *Arts* section of the articles on **England; Scotland;** and **Wales.**

Today, the arts in the United Kingdom are supported by the national government and by local authorities. The government, through the Arts Council of Great Britain, gives financial help to opera and ballet companies, orchestras, and theatres in England, Scotland, and Wales. It also sponsors painting and sculpture exhibitions. There is a separate Arts Council of Northern Ireland.

The United Kingdom has a total of about 10 major symphony orchestras and several smaller ones. Every summer, an internationally famous opera festival is held at Glyndebourne in East Sussex, England. There are about 300 professional theatres in the United Kingdom. There are about 50 theatres in London's West End. About as many new plays open each year in London as in New York City.

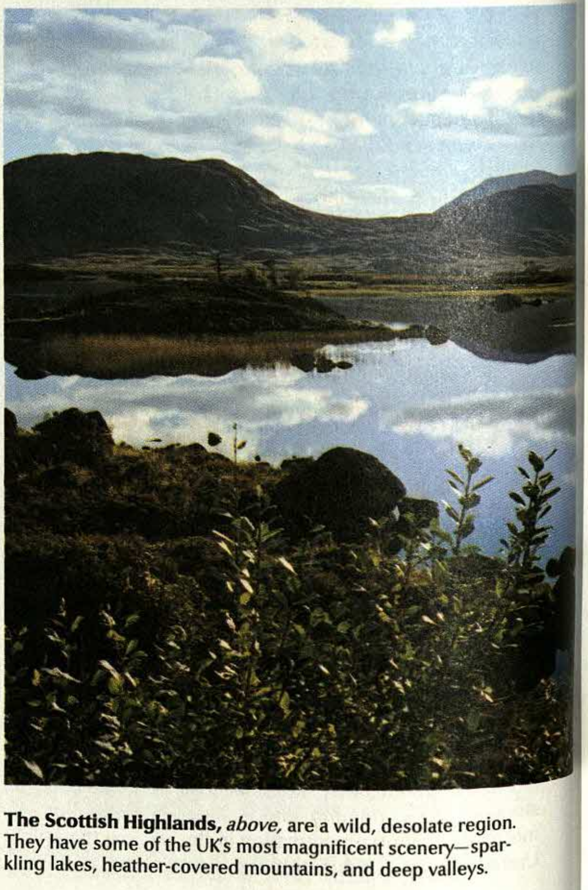
The artistic tradition of the countries that form the United Kingdom has continued. In the 1900's, many of the world's finest artists, musicians, and writers have been British. Henry Moore became one of the world's leading sculptors of the 1900's. Graham Sutherland, Francis Bacon, and other British painters have won worldwide fame. Benjamin Britten's works made him one of the world's outstanding composers.

The British film industry has produced some important films, but is largely dependent on American finance. Since the 1960's, British youth have created new sounds in popular music. One of the most popular groups, the Beatles, became a worldwide sensation.

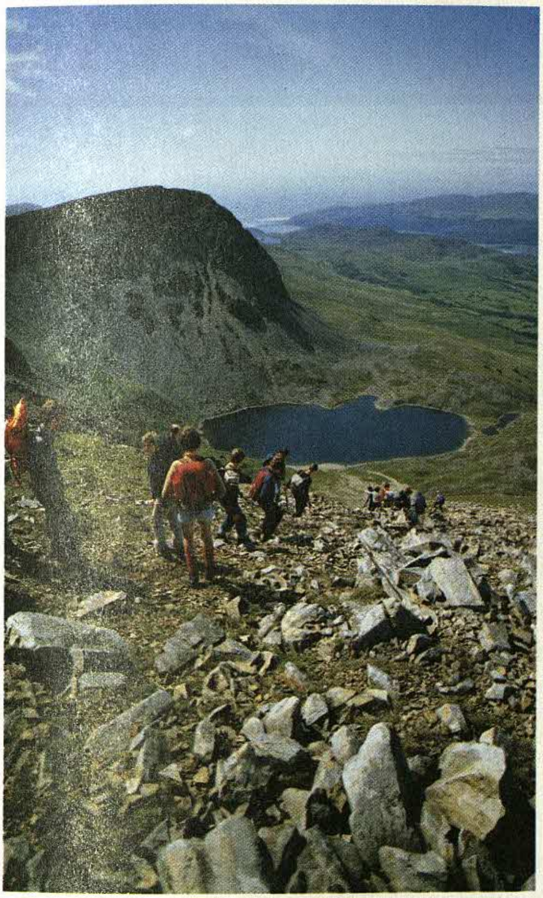
Since the early 1950's, a number of British playwrights have also attracted great attention. In their plays, some of these playwrights angrily attacked society and old traditions. The leading British playwrights since the mid-1900's include John Arden, Alan Ayckbourn, Robert Bolt, John Osborne, Harold Pinter, Peter Shaffer, Tom Stoppard, and Arnold Wesker.

Land

The United Kingdom covers most of an island group called the *British Isles.* The British Isles consist of two large islands—Great Britain and Ireland—and thousands of small islands. England, Scotland, and Wales occupy the island of Great Britain. Northern Ireland occupies the northeastern part of the island of Ireland. The inde-



The Scottish Highlands, *above,* are a wild, desolate region. They have some of the UK's most magnificent scenery—sparkling lakes, heather-covered mountains, and deep valleys.



Much of Wales is mountainous. Peaks such as Cader Idris, *above,* in Gwynedd, are popular with walkers and climbers.

pendent Republic of Ireland occupies most of this island. See **British Isles.**

The island of Great Britain is the eighth largest island in the world. It covers 218,980 square kilometres. The North Sea on the east and the English Channel on the south separate the island from the mainland of Europe. The island of Ireland lies to the west, across the Irish Sea. Great Britain is separated from mainland Europe by only about 30 kilometres of water at the closest point. Most of the coastline of Great Britain is so broken by deep bays and inlets that no point on the island is more than 120 kilometres from the sea.

The United Kingdom can be divided into eight main land regions. Seven of these regions occupy the island of Great Britain. They are (1) the Scottish Highlands, (2) the Central Lowlands, (3) the Southern Uplands, (4) the Pennines, (5) Wales, (6) the Southwest Peninsula, and (7) the English Lowlands. Northern Ireland makes up the eighth region.

The Scottish Highlands cover the northern half of Scotland. They are a region of mountain ranges, plateaus, and deep valleys. The highest point in the British Isles, 1,343-metre Ben Nevis, is in the Highlands. Many bays cut into the region's Atlantic Ocean and North Sea coasts. Some narrow bays, called *sea lochs,* are flanked by steep mountain slopes and reach far inland. The soil of this rugged, windswept region is thin and poor. Most of the Highlands is a *moor*—an area of coarse grasses, a few small trees, and low evergreen shrubs called *heather.* Few people live in this region. Most of them raise sheep or earn their living from fishing.

The Central Lowlands lie south of the Scottish Highlands, in the valleys of the Clyde, Forth, and Tay rivers. This region is a gently rolling plain. It has Scotland's best farmland and its richest coal deposits. Most of the Scottish people live there, and most of Scotland's industry is in the lowlands.

The Southern Uplands rise gently south of the Central Lowlands. This is a region of rounded, rolling hills. Sheep graze on the short grass that covers much of the hills. Their fleece goes to Scotland's famous woollen mills in the region's Tweed Valley. In the south, the uplands rise to the Cheviot Hills.

The Pennines are a region of rounded uplands that extend from the Scottish border about halfway down the length of England. They are also known as the *Pennine Chain* or *Pennine Hills,* and are often called the *backbone of England.* Their flanks are rich in coal. West of the Pennines lies the Lake District, a scenic area of clear, quiet lakes and low mountains. The Lake District is one of England's most famous recreation areas.

Wales lies southwest of the Pennines. It is separated from the Pennines by a narrow strip of the English Lowlands. The Cambrian Mountains cover most of Wales. These mountains are especially rugged and beautiful in the north, and are more rounded in central Wales. Southern Wales is largely a plateau deeply cut by river valleys. Most of the people live on the narrow coastal plains or in the deep, green river valleys. These are the best areas for crop farming. The rest of the land is too steep for growing crops, and is used mostly for grazing sheep. Wales has large deposits of coal in the south, though most of its mines have been closed.

The Southwest Peninsula lies south of Wales, across the Bristol Channel. It is a plateau whose surface is broken by great masses of granite. Near much of the coast, the plateau ends sharply in magnificent cliffs that tower above the sea. Tiny fishing villages lie in sheltered bays along the coast. The region has mild winters and summers that are not too dry. This climate helps make agriculture important in the fertile lowland areas. Farmers grow vegetables and raise dairy cattle.

The peninsula was once famous for its tin and copper mines, but they have been nearly worked out. More important today is the region's fine white china clay, used to make pottery. The Southwest Peninsula's beauty and pleasant climate attract many artists and hundreds of thousands of holidaymakers every year.

The English Lowlands cover all England south of the Pennines and east of Wales and the Southwest Peninsula. This region has most of the United Kingdom's farmable land, industry, and people. The lowlands consist chiefly of broad, gently rolling plains, broken here and there by low hills and ridges. Much of the land is a patchwork of fields and meadows, bordered by tall hedges, stone fences, or rows of trees.

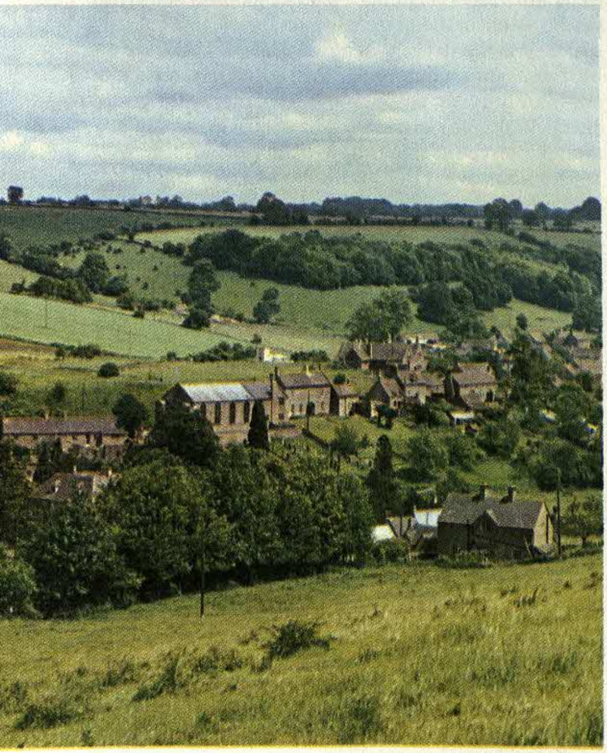
A grassy plain called the Midlands lies in the centre of the English Lowlands, just south of the Pennines. Parts of the Midlands extend along the western and eastern borders of the Pennines. The Midlands are the industrial heart of the United Kingdom. Birmingham, one of the world's greatest manufacturing cities, and Wolverhampton and other factory cities are near the centre of the Midlands in what is called the Black Country.

South of the Midlands, a series of hills and valleys crosses the land to the valley of the River Thames. London, the country's capital and commercial and cultural centre, stands on the River Thames. Most of the land north of the Thames and up to a bay of the North Sea called The Wash is low and flat. This area has some of the country's richest farmland. A great plain called The Fens borders The Wash. In The Fens, near Ely, is the lowest point in the country. It ranges from sea level to 4.5 metres below sea level, depending on the tide.

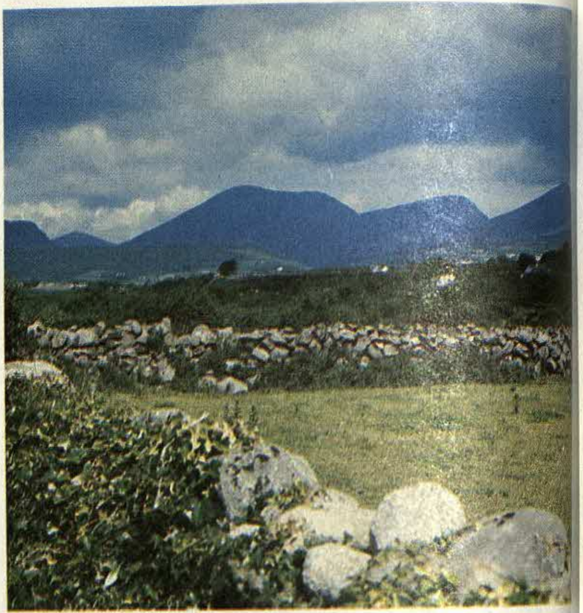
South of the Thames, low chalk hills and valleys cross the land. Where the hills reach the sea, they form great white cliffs. The most famous cliffs are near Dover. On clear days, people in Calais, France, can see the white cliffs of Dover gleaming in the sun.

Northern Ireland is a region of low mountains, deep valleys, and fertile lowlands. The land is lowest near the centre, and rises to its greatest heights near the coasts. The chief natural resources are rich fields and pastures, and most of the land is used for crop farming or grazing. About a fifth of the people of Northern Ireland live in Belfast, the capital and main industrial centre.

For more information on land regions, see the *Land* section in the articles on **England; Northern Ireland; Scotland;** and **Wales.**



The English Lowlands are chiefly a region of broad, rolling plains, broken by low hills. Naunton, *above,* and other charming old villages of stone houses nestle in the Cotswold Hills.



In Northern Ireland, the beautiful Mourne Mountains, on the east coast, look out across the Irish Sea. They are County Down's best-known tourist attraction.

Rivers and lakes. The United Kingdom's longest rivers are the Severn, which is 354 kilometres long, and the Thames, which is 346 kilometres long. Many British rivers have drowned, or sunken, mouths, called *estuaries,* up which the ocean tides flow. These rivers include the Clyde and Forth of Scotland; the Humber, Mersey, and Thames of England; and the Severn of England and Wales. Their estuaries make excellent harbours. Bristol, Hull, Liverpool, London, Southampton, and other cities on or near estuaries are important ports.

Lough Neagh in Northern Ireland is the largest lake in the British Isles. It is about 29 kilometres long and about 18 kilometres wide. Loch Lomond in Scotland is the largest lake on the island of Great Britain. It is about 35 kilometres long and over 7 kilometres wide at its widest point. England's biggest lakes are in the Lake District. The largest, Windermere, is about 16 kilometres long and up to about 1.5 kilometres wide.

For more information on rivers and lakes, see the *Rivers and lakes* section in the articles on **England; Northern Ireland; Scotland;** and **Wales.**

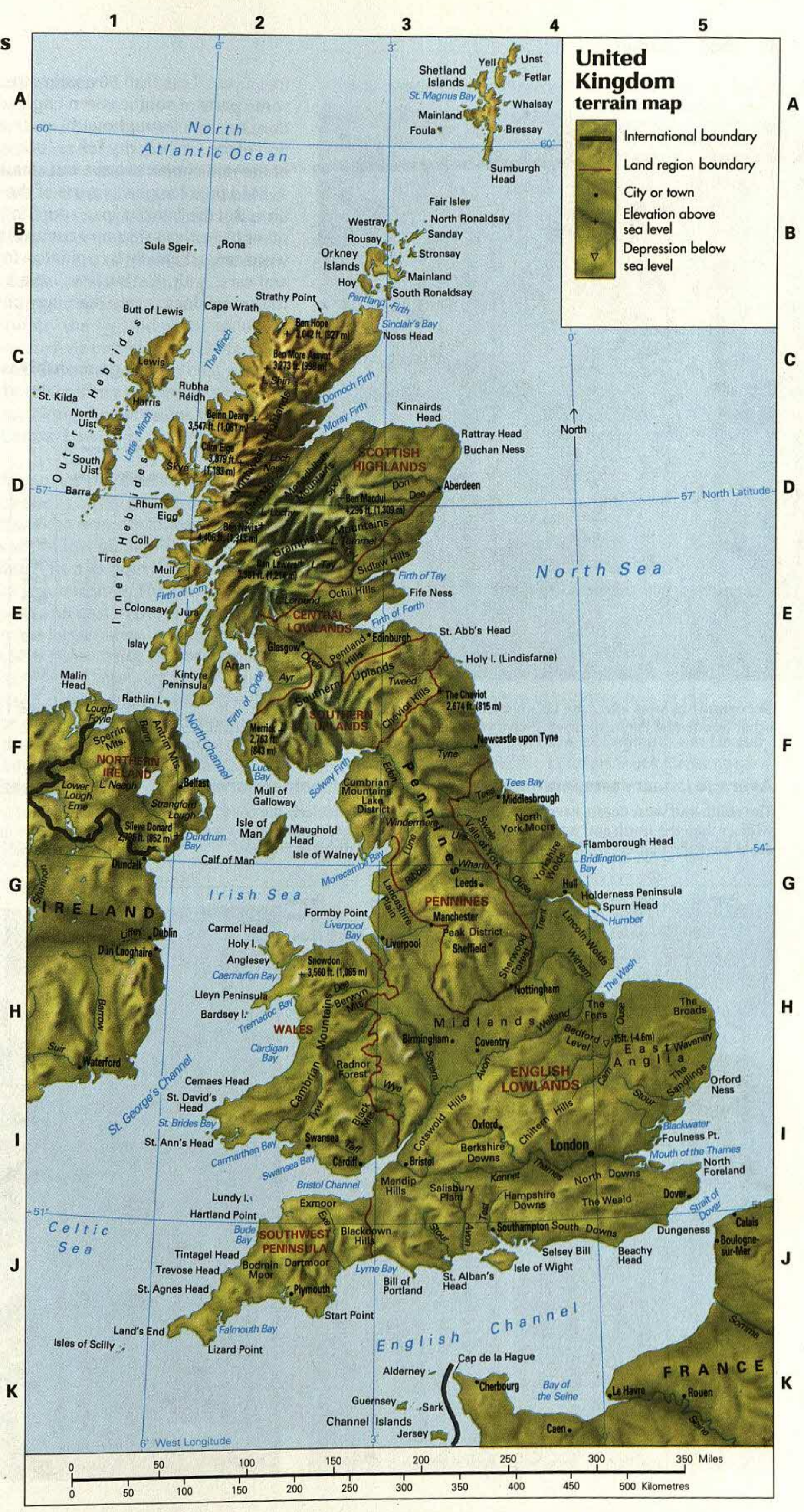
Climate

The United Kingdom has a mild climate, even though it lies as far north as bitterly cold Labrador, in Canada. Winter temperatures rarely drop as low as −12° C, and summer temperatures seldom reach 32° C. The climate is influenced by the Gulf Stream, a warm ocean current that sweeps up from the equator and flows past the British Isles. Steady southwest winds blow across this current and bring warmth in winter. In summer, the ocean waters are cooler than the land. Winds over the waters come to the UK as refreshing breezes.

The sea winds also bring plentiful rain. The heaviest rains fall in the highland areas of the western United Kingdom. Some of these areas get 380 to 510 centime-

Physical features

Alderney (island)	K	3
Anglesey (island)	H	2
Antrim Mountains	F	1
Arran (island)	E	2
Avon, River	J	3
Beachy Head	J	4
Ben Macdui (mountain)	D	3
Ben Nevis (mountain)	D	2
Black Mountains	I	3
Blackdown Hills	J	3
Bodmin Moor	J	2
Bristol Channel	I	2
Broads, The (region)	H	5
Butt of Lewis	C	1
Caernarfon Bay	H	2
Cam, River	I	4
Cambrian Mountains	I	2
Cape Wrath	C	2
Cardigan Bay	H	2
Carmarthen Bay	I	2
Channel Islands	K	3
Cheviot Hills	F	3
Chiltern Hills	I	4
Clyde, River	E	2
Cotswold Hills	I	3
Cumbrian Mountains	F	3
Dartmoor (moor)	J	2
Dee, River	H	3
Dornoch Firth	C	2
Dundrum Bay	G	2
Eden, River	F	3
Exmoor (moor)	J	2
Fens, The (region)	H	4
Firth of Clyde	F	2
Firth of Forth	E	3
Firth of Lorne	E	1
Firth of Tay	C	3
Flamborough Head	G	4
Glen Mor	D	2
Grampian Mountains	D	2
Guernsey (island)	K	3
Hartland Point	J	2
Humber, River	G	4
Jersey (island)	K	3
Jura (island)	E	2
Kinnairds Head	C	3
Lake District	F	3
Land's End (point)	K	3
Lewis with Harris	C	1
Little Minch	D	1
Lizard Point	K	2
Lleyn Peninsula	H	2
Loch Foyle	F	1
Loch Lomond	E	2
Loch Ness	D	2
Loch Shin (lake)	C	2
Lough Erne (lake)	F	1
Lough Neagh	F	1
Luce Bay	F	2
Lundy (island)	I	2
Mainland (island)	B	3
Man, Isle of	G	2
Minch, The	C	2
Monadhliath Mountains	D	2
Moray Firth	D	2
Morecambe Bay	G	3
Mull (island)	E	1
North Downs	I	4
North Uist (island)	C	1
North York Moors	G	4
Northwest Highlands	D	2
Orkney Islands	B	3
Ouse, River	H	4
Outer Hebrides	D	1
Peak District	G	3
Pennines	F	3
Pentland Firth	C	3
Radnor Forest	H	3
Rathlin (island)	F	1
Rhum (island)	D	1
St. Abb's Head	E	3
St. Brides Bay	I	2
St. David's Head	I	2
Salisbury Plain	I	3
Sark (island)	K	3
Scilly, Isles of	K	1
Severn, River	H	3
Shetland Islands	A	3
Skye (island)	D	1
Slieve Donard (mountain)	G	1
Snowdon (mountain)	H	2
Solway Firth	F	2
South Downs	J	4
South Uist (island)	D	1
Southern Uplands	F	2
Sperrin Mountains	F	1
Spey, River	D	3
Stour, River	I	5
Sumburgh Head	B	4
Swale, River	G	3
Tay, River	D	3
Tees, River	F	4
Test, River	J	4
Thames, River	I	4
Tremadoc Bay	H	2
Trent, River	G	4
Tweed, River	F	3
Tyne, River	F	3
Wash, The	H	4
Waveney, River	H	5
Welland, River	H	4
Wharfe, River	G	3
Wight, Isle of	J	4



Surrounding seas affect the UK's climate. Brixham, *above,* and other Southwest Peninsula towns have very mild climates.

tres a year. Less than 50 centimetres of rain falls yearly in some parts of southeastern England. The United Kingdom has rain throughout the year, and rarely is any section of the country dry for as long as three weeks. Much of the rain comes in light, but steady, drizzles.

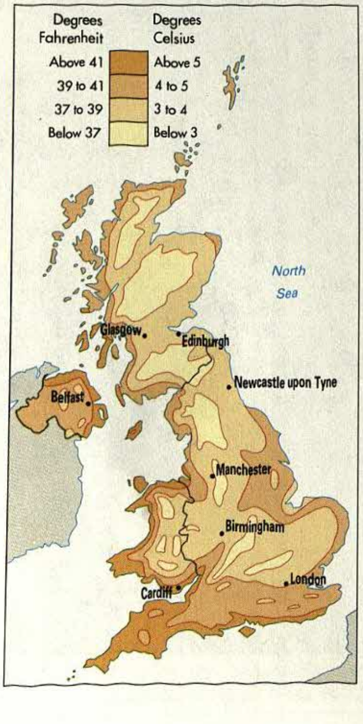
Mild fogs hang over parts of the country from time to time. But the famous "pea soup" fogs of London and other big cities seldom occur any more. These fogs were caused chiefly by pollution from homes, factories, and cars. Antipollution laws have helped make such fogs much less severe than they once were.

Average monthly weather

	London						Edinburgh				
	Temperatures				Days of rain or snow		Temperatures				Days of rain or snow
	F°		C°				F°		C°		
	High	Low	High	Low			High	Low	High	Low	
Jan.	44	35	7	2	17	Jan.	43	35	6	2	18
Feb.	45	35	7	2	13	Feb.	43	35	6	2	15
Mar.	51	37	11	3	11	Mar.	47	36	8	2	15
Apr.	56	40	13	4	14	Apr.	50	39	10	4	16
May	63	45	17	7	13	May	55	43	13	6	15
June	69	51	21	11	11	June	62	48	17	9	15
July	73	55	23	13	13	July	65	52	18	11	17
Aug.	72	54	22	12	13	Aug.	64	52	18	11	17
Sept.	67	51	19	11	13	Sept.	60	48	16	9	16
Oct.	58	44	14	7	14	Oct.	53	44	12	7	18
Nov.	49	39	9	4	16	Nov.	47	39	8	4	18
Dec.	45	36	7	2	16	Dec.	44	36	7	2	17

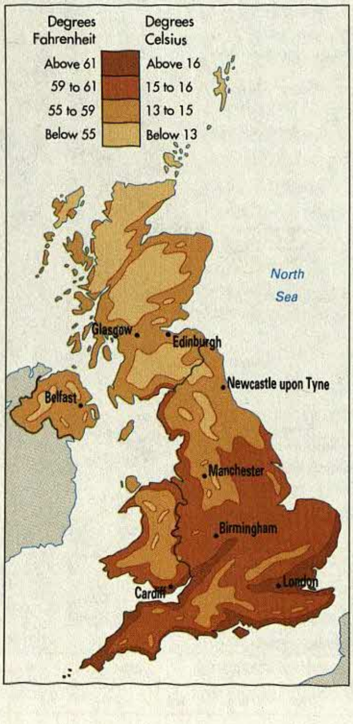
Average January temperatures

The south and west coasts have milder winters than the north and east. Upland areas have the coldest weather.



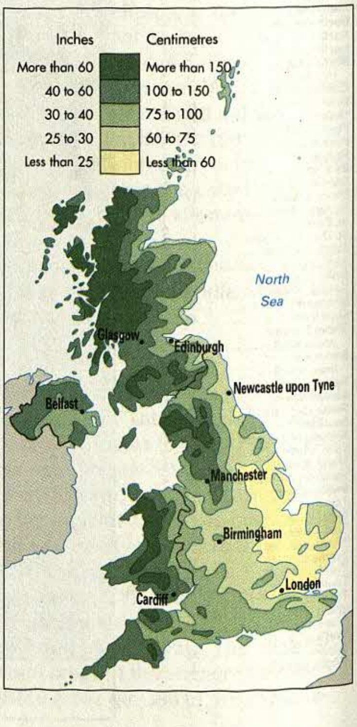
Average July temperatures

The south, particularly the coast, has warmer summer temperatures than Scotland and the north of England.



Average yearly precipitation

The west coast and upland areas of the UK receive the most precipitation. Eastern England receives the least.



Economy

The United Kingdom is one of the world's great manufacturing and trading nations. In fact, the UK can survive only by manufacturing and trading. The country's farms produce only about two-thirds of the food needed by the people. Except for coal, low-grade iron ore, natural gas, and oil, the UK has few natural resources. The country must import about a third of its food and many of the raw materials it needs for manufacturing.

Natural resources. Large deposits of coal and iron ore helped make the country the first industrial nation in the world. Coal has been heavily mined in the United Kingdom for over 300 years. However, many coal mines were closed in the early 1990's. The richest layers of coal reserves near the surface along the Pennines, in southern Wales, and in the Central Lowlands of Scotland have been worked out.

The United Kingdom also has plentiful iron ore. This ore lies near the surface and is easily mined. Yet the UK imports about four-fifths of the iron ore it needs because its own supplies are of low quality. The imported ore contains twice as much iron as does British ore, and much more steel can be made from it. The UK's largest iron ore deposits lie south and east of the Pennines.

The United Kingdom has large natural gas fields located below the North Sea. These fields provide most of the country's natural gas needs. Large petroleum deposits off the coast of Scotland supply enough oil to meet the country's needs. The oil is transported via pipeline from the North Sea to the United Kingdom. Some of the oil is exported to the United States, the Netherlands, Germany, and other countries.

Small deposits of lead are scattered throughout the country. The UK has a little tin and copper, chiefly in the Southwest Peninsula. The peninsula also has fine china clay, used in making pottery. Southeastern England has large deposits of chalk, used in making cement.

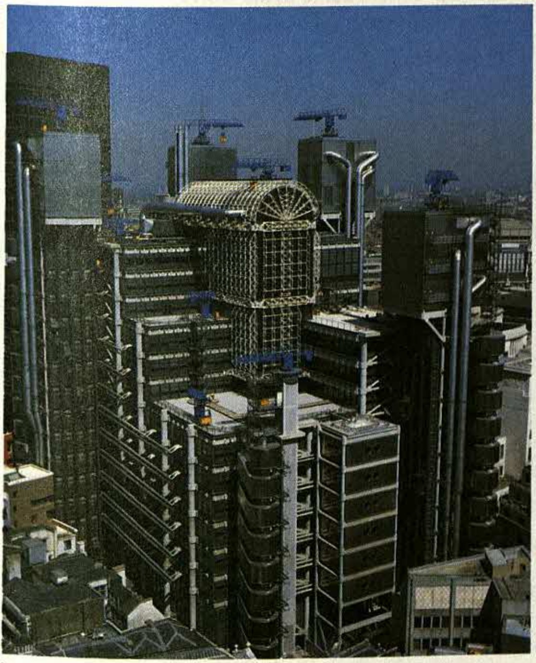
Only about a third of the land is fertile enough for growing crops. Most of this land is located in the English Lowlands. The highland areas have thin, poor soils, and are used chiefly for grazing sheep. Forests cover only a small part of the country. The shallow seas surrounding the UK are excellent fishing grounds.

Government ownership. The national government owns—wholly or partly—some British industries and services. A public corporation manages each one. The members of each corporation are appointed by the minister responsible for the particular industry or service. Industries and services that are wholly or partly operated by the government include coal mining, the railways, and the postal service.

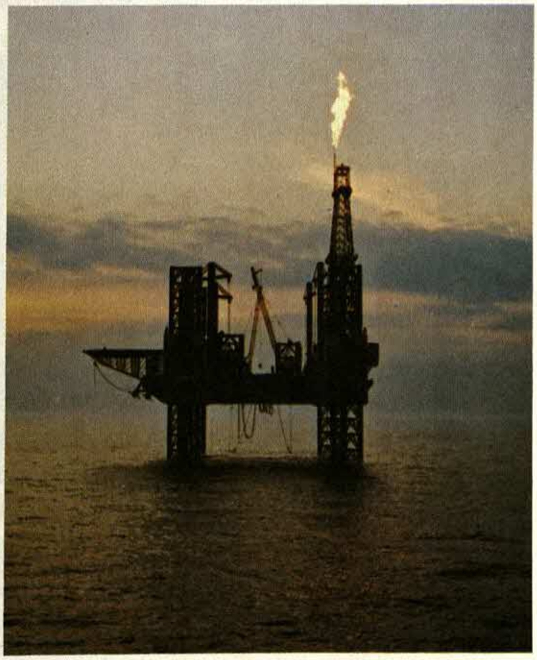
Service industries account for about two-thirds of the United Kingdom's *gross domestic product* (GDP). The GDP is the total value of goods and services produced within the country annually. More than 70 per cent of British workers are employed in service industries. The country's service industries are concentrated in and near its largest cities, especially London.

Finance, insurance, and property is the most important service industry in the UK. Most of the country's financial companies operate in London, one of the world's leading financial cities. Major financial institutions in London include the Bank of England, the United Kingdom's national bank; the London Stock Exchange; and Lloyd's of London insurance group.

Service industries are very important to the British economy. Lloyd's, housed in this modern building in London, provides insurance services that are used throughout the world.



Natural gas fields lie off the shores of the United Kingdom, in the southern part of the North Sea. These gas fields yield enough gas to supply most of the country's needs.



Community, social, and personal services rank second among the service industries. This industry employs more British workers than any other service industry. It includes such activities as education and health care, and advertising and data processing.

Wholesale and retail trade is the third most important service industry. The most valuable wholesale trading activities include the distribution of petroleum, and textiles. Aberdeen and London are important centres of petroleum refining and distribution. Leeds is the chief centre of the British clothing industry. Retail trade is centred in London, which has thousands of small shops and attracts millions of tourists yearly.

Tourism is another of the UK's important service industries. It is a growing source of income and employment. Other large service industries include government, transportation and communication, and utilities.

Manufacturing. The Industrial Revolution began in the United Kingdom in the 1700's, and the UK is still a leading industrial nation. In 1988, only the United States, the Soviet Union, Japan, Germany, and France produced more manufactured goods. British factories have long been known for cars, ships, steel, and textiles. Today, the UK manufactures a wide variety of products.

Most British industries are in central England, the London area, the Central Lowlands of Scotland, the Newcastle upon Tyne area, and southern Wales. Early factories were located near the coal fields because coal powered the machinery. Today, power from petroleum, natural gas, and nuclear energy has enabled many new industries to develop far from the coal fields, especially in southern England.

The United Kingdom ranks as an important steel producer. It exports about a third of its finished steel. The rest is used in the UK to make hundreds of products. Much steel is used in manufacturing cars, buses, trucks, and motorcycles. Such British cars as the Jaguar and Rover are popular in many countries. The Rolls-Royce is one of the world's most luxurious and expensive cars. British car production declined in the 1970's and 1980's, and the country now imports more cars than it exports.

The United Kingdom also produces heavy machinery for industry, farming, and mining. These products include cranes, earthmovers, road-graders, tractors, harvesters, and drilling machines. British factories also make railway equipment, household appliances, and machine tools. The city of Sheffield is famous for its high-quality knives, forks, and spoons.

British Aerospace, a privately owned company, makes a wide range of jet aircraft. Rolls-Royce is world-famous for aeroplane engines. Space satellites and weapons defence systems are also produced in the UK. Aerospace equipment and various kinds of heavy machinery are major exports.

An increasing percentage of the United Kingdom's manufactured goods consists of sophisticated electronic equipment. Factories produce such items as cable television equipment, fibre-optic communications systems, microfilm readers and printers, radar devices, and undersea telephone cables.

The chemical industry produces a variety of products—from industrial chemicals to plastics and soap. The UK is the fourth largest exporter of pharmaceuticals. The British pottery industry is centred on Stoke-on-Trent. Outstanding names in British pottery include Royal Worcester, Spode, and Wedgwood.

The United Kingdom ranks as one of the world's chief centres of printing and publishing. British companies print paper money and postage stamps for many countries. Books published in the UK are exported throughout the English-speaking world.

The Industrial Revolution began in the British textile industry. Today, the United Kingdom remains an important producer of cotton and woollen textiles. British manufacturers also make synthetic fibres and fabrics. Scotland produces some of the world's finest woollen

Chemical production is an important part of the United Kingdom's manufacturing industry. One company, Imperial Chemical Industries (ICI), is one of the world's largest chemical companies. Ammonia, a raw material used to make agricultural fertilizers, is one of the products made at ICI's large chemical works at Billingham, in Cleveland, England.

products. Northern Ireland has a worldwide reputation for its delicate, pure white linen.

The UK has one of Europe's largest clothing industries. The biggest centres are London, Leeds, and Manchester. British clothing has long been famous for its quality. The UK has created many new fashions, especially in men's clothing. The first Oxford shoes, bowler hats, cardigan sweaters, and raglan sleeves all were made in the UK. Today, the UK imports more clothing than it exports because many countries with lower labour costs can produce clothing more cheaply than can the British.

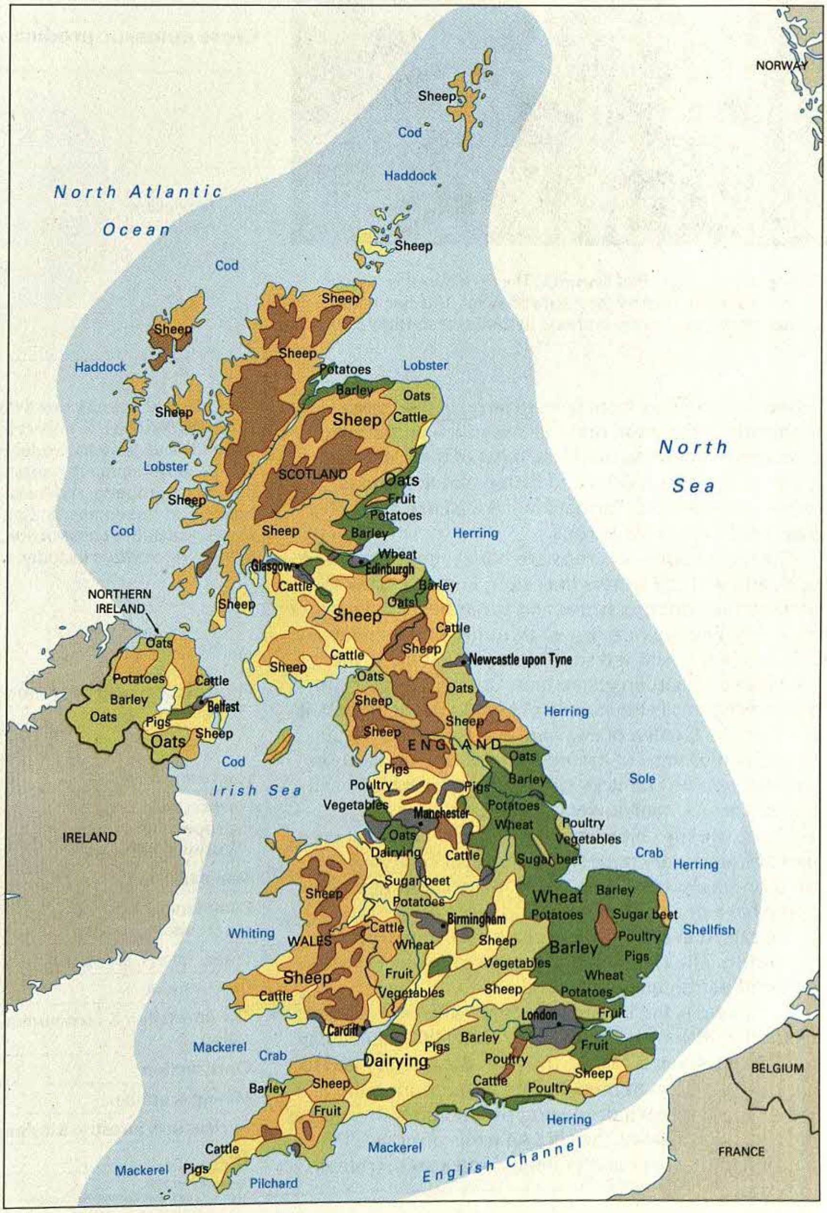
Processing of foods and beverages ranks as a major industry. Most processed foods and beverages are consumed in the UK. But some are exported. Scotch whisky, made in Scotland, has a large world market. Other British industries manufacture bricks and cement, furniture, leather goods, glassware, and paper.

Agriculture. Since the end of World War II in 1945, the United Kingdom's farms have been modernized rapidly, and production has increased steadily. But the UK must still import about a third of its food supply because the country does not have enough farmland to support its dense population.

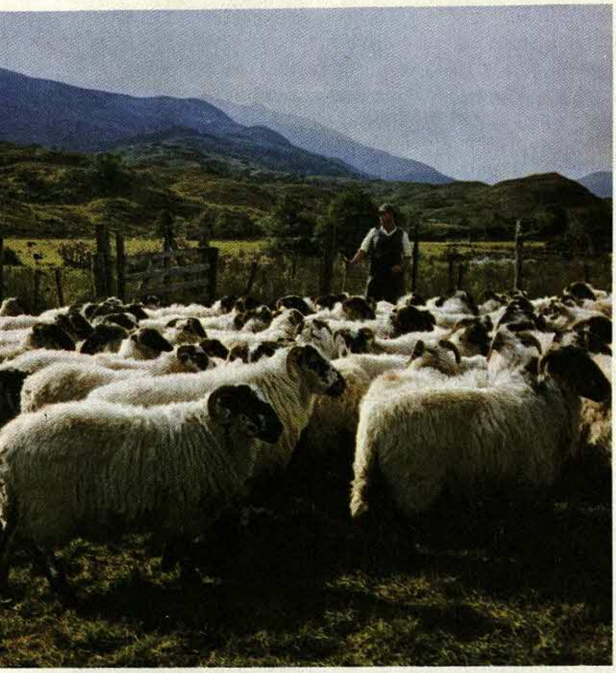
The United Kingdom has about 240,000 farms. They average about 120 hectares in size. About two-thirds of farmers own the farms on which they live. The rest rent their farms. Over half the farms are run on a part-time basis. Many farmers practise *mixed farming*—that is, they raise a variety of crops and animals. Methods of

Land use in the United Kingdom

This map shows the economic uses of land in the United Kingdom. It also indicates the country's main farm products, and its most important fishing products. Major cities are also shown. The UK's most important livestock are beef and dairy cattle, pigs, poultry, and sheep. The country's main crops are barley, potatoes, sugar beet, and wheat.



🟩 Arable land
🟩 Mixed farming
🟨 Pastoral farming
🟧 Grazing land
🟫 Forest, heath, and moor land
⬛ Urban area
⬜ Fishing
• City



Sheep are the UK's chief livestock. They are raised in almost every part of the country for meat and wool. This fine herd comes from a farm near Inverness in the Scottish Highlands.

mixed farming vary from farm to farm. In the rough highlands of the west, grass grows much better than farm crops. There, farmers use most of their land for grazing. The east is drier and flatter, and the land is more easily worked. Farmers in the east use most of their land for growing crops.

The most important crops are barley, potatoes, sugar beet, and wheat. Farmers in eastern England grow almost all the country's wheat and sugar beet, and most of its barley. Potatoes are grown throughout the country. Farmers in the east and southwest grow most of the UK's fruit and garden vegetables. One of the most productive regions is the county of Kent in the southeast. It is called the Garden of England, and is famous for the beautiful blossoms of its apple and cherry orchards in springtime. The country's chief vegetables include cabbages, carrots, cauliflowers, onions, and peas.

Sheep are the chief livestock. Farmers in almost every part of the country raise sheep for meat and wool. British farmers also raise beef cattle, dairy cattle, and pigs. Some have poultry, but more and more poultry are being raised in special mass-production *factory farms.*

Mining. The United Kingdom is a major world producer of petroleum and natural gas.

Petroleum is the United Kingdom's most valuable mineral. British oil wells produce about 900 million barrels of petroleum a year. In the past, the country had to import petroluem to meet its needs. But during the 1970's, the UK began producing petroleum from wells in the North Sea. Today, the UK's oil wells provide all the petroleum that the country needs, and also petroleum for export.

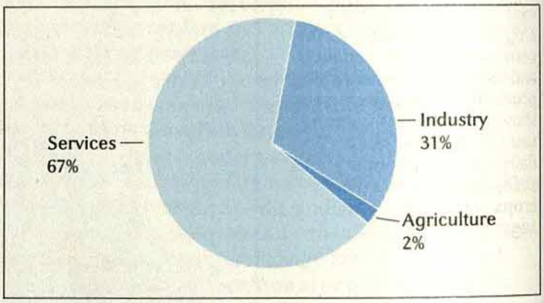
The UK obtains natural gas from deposits below the North Sea. These deposits provide enough gas to meet most of the country's needs.

Coal has played an important part in the United Kingdom's economy. But the coal industry is in decline. The UK's largest coal-mining regions are in Nottinghamshire and Yorkshire. High-quality bituminous coal from these areas is an important source of fuel for the country's electric power stations.

The UK's next most important minerals, in order of value, are sand and gravel, limestone, and clays. Other British minerals include sandstone, chalk, and gypsum.

Fishing. Fishing is an important industry. The fishing industry supplies over 620,000 metric tons of fish yearly. About half this catch comes from the waters surround-

Gross domestic product of the United Kingdom



The United Kingdom's gross domestic product (GDP) was 1,018,000,000,000 U.S. dollars in 1991. The GDP is the total value of goods and services produced within a country in a year. *Services* include community, social, and personal services; finance, insurance, property, and business services; government; trade, hotels, and restaurants; and transportation and communication. *Industry* includes construction, manufacturing, and mining and utilities. *Agriculture* includes agriculture, forestry, and fishing.

Production and workers by economic activities

		Employed workers	
Economic activities	**Per cent of GDP produced**	**Number of people**	**Per cent of total**
Finance, insurance, property, & business services	23	2,693,000	12
Manufacturing	20	4,162,000	19
Community, social, & personal services	16	5,392,000	24
Trade, hotels, & restaurants	14	4,686,000	21
Government	7	1,634,000	8
Transportation & communication	7	1,349,000	6
Construction	6	962,000	4
Mining & utilities	5	1,099,000	5
Agriculture, forestry, & fishing	2	291,000	1
Total	100	22,268,000	100

Figures are for 1991.
Source: Central Statistical Office, London.

ing the UK, especially the North Sea. British fishing crews also fish as far away as the Grand Banks, off the coast of Newfoundland, and Canada. The principal catches include cod, haddock, herring, mackerel, plaice, pollock, sand eel, and whiting. Large catches of shellfish are also brought in.

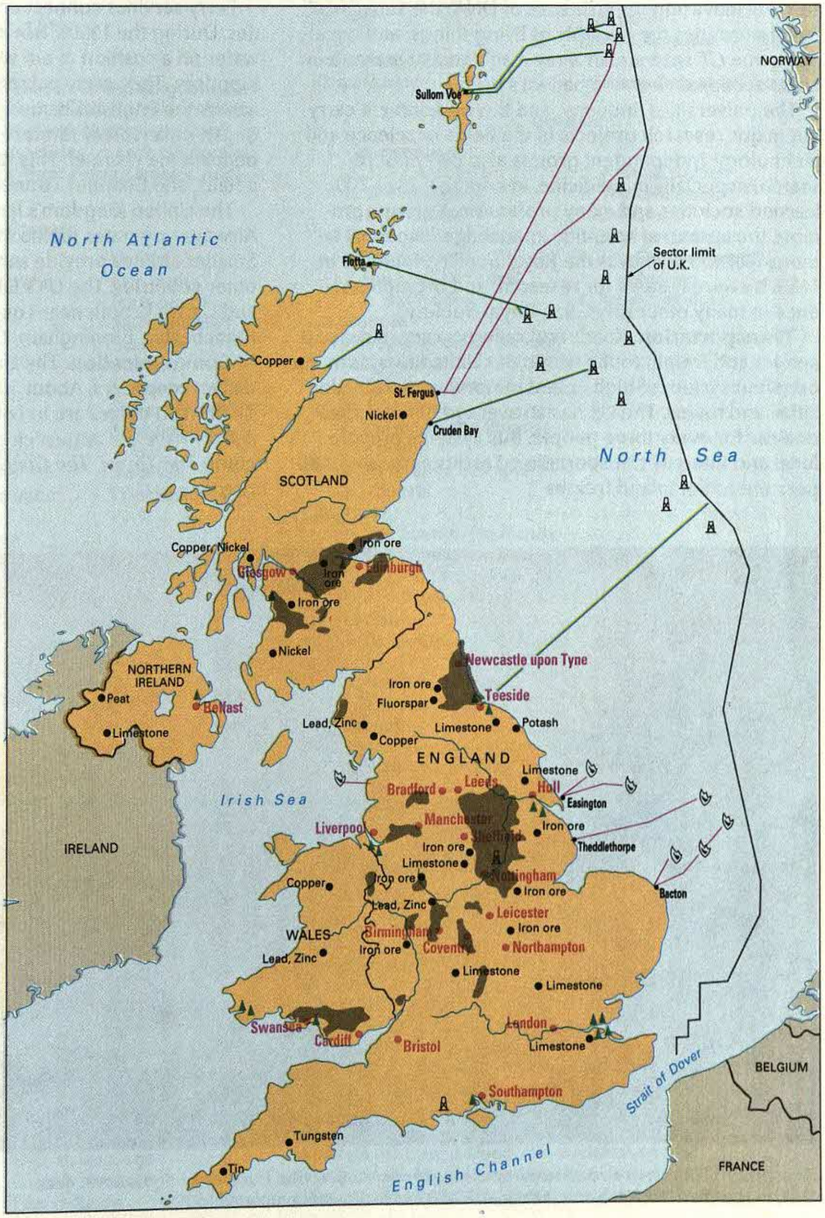
Electric power. Fuel-burning steam plants provide about 80 per cent of the UK's electric power. The UK is a world leader in the production of nuclear energy for peaceful uses. Nuclear energy provides about 18 per cent of the country's electricity. In 1956, the world's first large-scale nuclear power station opened at Calder Hall, Cumberland (now Cumbria), in England.

Foreign trade. Only the United States, Germany, Japan, and France outrank the UK in value of foreign trade. The UK once imported chiefly raw materials and exported mostly manufactured products. But manufactured goods now account for about two-thirds of British imports and about two-thirds of its exports. Most of the UK's trade is with other developed countries. These countries sell the surplus manufactured products in which they specialize to each other. The UK exports aerospace equipment, chemicals, heavy machinery, medicines, motors, petroleum, and transportation equipment. Its imports include coffee and tea, electric appliances, fruit and vegetables, metal ores, office machines, paper, vehicles, and yarns and fibres.

The United States and Germany are the United Kingdom's leading customers and suppliers. Other trade partners include Belgium, Canada, Denmark, France,

Mining, manufacturing, and natural resources in the United Kingdom

This map shows the chief mineral resources and the major manufacturing centres in the United Kingdom. It also shows the country's most important natural resources—its coal, natural gas, and oil fields. Manufacturing centres are printed in red.



Ireland, Italy, Japan, the Netherlands, Norway, Saudi Arabia, Sweden, and Switzerland.

The value of the UK's imports of goods usually exceeds the value of its exports. British banks and insurance companies make up part of the difference by selling their services in other lands. Another important source of income is the spending by the more than 12 million tourists who visit the country each year. The merchant fleet also brings in money by carrying cargoes for other countries. The income from all these *invisible* exports exceeds 4 billion British pounds a year.

Science and technology. The United Kingdom has made many outstanding achievements in science and technology. About 70 British scientists have won Nobel Prizes. They have been honoured for such achievements as discovering penicillin; explaining the structure of the atom; discovering the structure of DNA, the substance that determines the heredity of living things; and developing the *CT scanner,* an X-ray machine that makes a cross-sectional view of a patient's body.

The universities, industry, and the government carry out major research projects in the fields of science and technology. Independent groups also carry out research, especially in medicine. In addition, over 200 learned societies and many professional groups promote the spread of scientific knowledge. The most famous learned society is the Royal Society, founded in 1660. It awards grants for research, and promotes science in many other ways. See **Royal Society.**

Transportation. Roads and railways carry most passenger and freight traffic within the United Kingdom. An excellent system of high-speed motorways links major cities and towns. The UK has an average of more than one car for every three people. Bus systems provide local and intercity transportation. Lorries carry about 80 per cent of the inland freight.

An extensive rail network crisscrosses the UK. It is owned by the government and provides excellent high-speed passenger service, as well as freight hauling.

The United Kingdom has a large merchant fleet. Ships in the fleet carry British-made goods to ports throughout the world, and bring back imports. British ships also carry freight for other countries. There are more than a dozen major ports and hundreds of smaller harbours.

The inland waterways of the United Kingdom are used to carry freight, as well as for recreational boating. The Thames, which flows through London, is the country's busiest river, and one of the busiest in the world. The country's second busiest river is the Mersey, which flows through Liverpool to the Irish Sea. The UK's most important canal, the Manchester Ship Canal, links the city of Manchester with the Mersey.

Ferry services connect coastal and island communities. During the 1960's, *hovercraft* (vehicles that ride over water on a cushion of air) went into service in the United Kingdom. They carry passengers along the coasts and across the English Channel to France. In 1987, work began on a railway tunnel linking England and France beneath the channel. This railway opened in 1994. For details, see **Channel Tunnel.**

The United Kingdom's largest airline—British Airways—operates flights to all parts of the world. Smaller airlines provide service within the UK and to other countries. The UK's largest airports are Heathrow and Gatwick, both near London, and the air terminals at Manchester, Birmingham, Glasgow, and Luton.

Communication. The United Kingdom has over 100 daily newspapers. About 10 have nationwide circulation. Their main offices are in London. *The Sun* and the *Daily Mirror* have the largest circulations. Other papers include *The Times, The Guardian,* and *The Daily Telegraph.*

The United Kingdom's road network is highly developed. The Humber Bridge, *above,* near Hull, in Humberside, has a single span of 1,410 metres. It was completed in 1981.

The United Kingdom has about one television set for every two people and about one radio for every person. The British Broadcasting Corporation (BBC), a public corporation, provides radio and television services. Other broadcasting services are controlled by the Radio Authority and the Independent Television Commission (ITC). The BBC has no commercials. It is financed chiefly by yearly licence fees that people must buy to own a television set. Services controlled by the Radio Authority and the ITC broadcast commercials.

The British Post Office provides many services in addition to handling mail. For example, local post offices sell TV licences and national insurance stamps. People can draw pensions and social security payments, and bank their savings at the post offices.

Study aids

Related articles in *World Book.* See **United Kingdom, Government of the,** and **United Kingdom, History of the,** and their lists of *Related articles.* See also **England; Northern Ireland; Scotland; Wales;** and the separate articles on each county and region of the United Kingdom and their *Related articles.* Additional related articles include:

Cities and towns

Aberdeen
Bath
Belfast
Birmingham
Bristol
Cambridge
Canterbury
Cardiff
Coventry
Dover
Dundee
Durham
Edinburgh
Glasgow
Glastonbury
Gretna Green
Hull
Inverness
Leeds
Leicester
Lincoln
Liverpool
London
Londonderry
Manchester
Newcastle upon Tyne
Nottingham
Oxford
Plymouth
Portsmouth
Saint Andrews
Salisbury
Sheffield
Southampton
Stoke-on-Trent
Stratford-upon-Avon
Swansea
Winchester
York

Physical features

Avon, River
Ben Nevis
Bristol Channel
Channel Islands
Clyde, River
Dover, Strait of
English Channel
Firth of Clyde
Firth of Forth
Giant's Causeway
Humber, River
Irish Sea
Land's End
Loch Lomond
Lough Neagh
Man, Isle of
Mersey, River
Pennine Hills
Severn, River
Thames, River
Tweed, River
Wight, Isle of
Windermere

Education

See the article **United Kingdom, Educational systems of the,** and its list of *Related articles.* See also:

Education
School
University

Social and cultural life

See the article **United Kingdom, Arts of the,** and its list of *Related articles.* See also:

Architecture
Ballet
Book
British Broadcasting Corporation
British Council
British Library
British Museum
Celtic art
Classical music
Country crafts
Dancing
Drama
English language
English literature
Film industry
Library
Museum
Music
National parks
National trusts
Opera
Painting
Pantomime
Pottery
Public houses
Religion
Royal Academy of Arts
Royal Society
Sculpture
Stately homes of Britain and Ireland
Theatre

Other related articles

Bank of England
British Isles
Commonwealth of Nations
Crown
Crown jewels
Europe, Council of
European Union
God Save the Queen
John Bull
Lloyd's
North Atlantic Treaty Organization
Royal family of the United Kingdom
Royal household of the United Kingdom
Royal Mint
United Kingdom, Armed services of the
United Kingdom, Geology of the
United Kingdom, Legal systems of the
Western European Union

Outline

I. Government
  A. The Constitution
  B. The monarchy
  C. Parliament
  D. The prime minister
  E. The Cabinet
  F. Her Majesty's Loyal Opposition
  G. Political parties
  H. The civil service
  I. Law courts
  J. Local government
  K. The Commonwealth of Nations
  L. Armed services
II. People
  A. Population and ancestry
  B. Language
  C. Social welfare
  D. Education
  E. Museums and libraries
  F. Religion
  G. Recreation and sports
  H. The arts
III. Land
  A. The Scottish Highlands
  B. The Central Lowlands
  C. The Southern Uplands
  D. The Pennines
  E. Wales
  F. The Southwest Peninsula
  G. The English Lowlands
  H. Northern Ireland
  I. Rivers and lakes
IV. Climate
V. Economy
  A. Natural resources
  B. Government ownership
  C. Service industries
  D. Manufacturing
  E. Agriculture
  F. Mining
  G. Fishing
  H. Electric power
  I. Foreign trade
  J. Science and technology
  K. Transportation
  L. Communication

Questions

What four countries make up the United Kingdom?
What is the most popular team sport in the United Kingdom?
Why does the United Kingdom have a mild climate, even though it lies as far north as Labrador, in Canada?
What is Her Majesty's Loyal Opposition?
What two minerals helped make the United Kingdom the world's first industrial country?
Why is the United Kingdom so dependent on foreign trade?
What are the main land regions of the United Kingdom?
What are the United Kingdom's *invisible* exports?
Which are the United Kingdom's two busiest rivers?
What are the United Kingdom's most important crops?

The Royal Navy aircraft carrier HMS *Ark Royal*, *above, centre,* is fitted with a "skijump" ramp on deck to improve the takeoff of the Sea Harrier. She also carries Sea King helicopters.

Armed services of the United Kingdom

United Kingdom, Armed services of the. The armed services of the United Kingdom (UK) have played an important part in UK history. The armed services are divided into four major forces; the Royal Navy, the Royal Marines, the British Army, and the Royal Air Force.

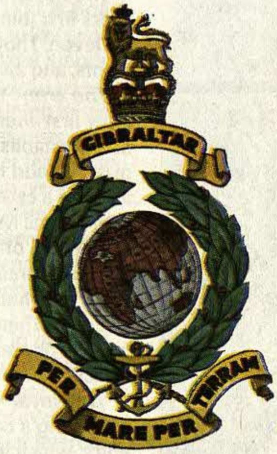
The four services

The Royal Navy is the oldest of the four services and, because the UK is an island nation, the navy has always had an important role in defence. It is affectionately known as the "Senior Service" and has a proud history. In 1588, Sir Francis Drake and other Elizabethan sailors destroyed the might of the Spanish Armada (see **Spanish Armada**). Admiral Lord Horatio Nelson died at the moment of victory over a combined Spanish-French fleet at the Battle of Trafalgar in 1805 (see **Trafalgar, Battle of**). Royal Navy ships escorted convoys carrying vital war supplies during attacks by German submarines in the Battle of the Atlantic during World War II (see **World War II**).

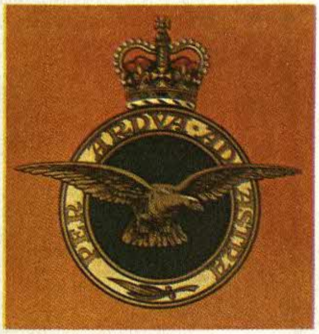
The Royal Marines serve both on the land and on ships at sea. True to their motto, *Per Mare Per Terram* (By Sea, By Land), they can operate in any terrain and under the toughest of conditions. In 1982, during the Falklands conflict with Argentina, Commando Brigade of the Royal Marines played an important part in the recapture of the Falkland Islands from numerically superior forces.

Combat in the 1990's requires sophisticated modern weapons. Soldiers can knock out a tank with a *Milan* antitank missile.

The White Ensign is the flag of the Royal Navy and is flown by naval vessels. It is a St. George's Cross with the Union Flag in the canton (the upper quarter closest to the mast).



The Royal Marines badge commemorates the part the corps played in the capture of Gibraltar in 1704.



The RAF badge is worn by all members of the service. The motto on the badge is *Per Ardua ad Astra* (Through Difficulties to the Stars).

The British Army is the largest of the four services. Its soldiers have fought in battles throughout the world. At battles such as Blenheim, Waterloo, and El Alamein, the British soldier has won not only fame but also the respect of the enemy. See **Army** (Famous land battles).

The men of the Rifle Brigade (now part of the Royal Greenjackets) wore green uniforms. All other British infantry wore bright red tunics until the 1880's. Then the familiar *khaki* (brown) uniform was introduced. Nowadays, soldiers wear camouflage dress when on active service. Most units, however, still wear colourful ceremonial uniform when taking part in special parades such as Trooping the Colour.

The Royal Air Force (RAF) was formed in 1918 from the Royal Flying Corps (then an army corps), and became the world's first independent air force. Its most famous actions include the Battle of Britain (1940) and the night bombing raids on Germany during the later years of World War II (see **Battle of Britain; World War II**). It has also taken part in many smaller campaigns, including the Korean, Falklands, and Persian Gulf wars.

People in the armed services

Recruiting and personnel. In the early 1990's, over 300,000 personnel, about 16,000 of them women, served in the UK armed services. All members of the services are volunteers, unlike members of other European armed services, many of whom are conscripts. All the armed services work in close cooperation within the North Atlantic Treaty Organization (NATO), and concentrate their resources within the United Kingdom and in Central Europe. The Royal Navy maintains small detachments in the Caribbean, the Far East, and the Mediterranean, and around the Falkland Islands. Outside Europe, the army has bases in Belize, Cyprus, the Falklands, Gibraltar, and Hong Kong.

The Jaguar, *right,* is one of the RAF's attack aircraft. It is a twin-engine, supersonic strike fighter produced jointly by the United Kingdom and France. There are several versions, including two-seaters for training and combat. Jaguars can carry under-wing or over-wing guided missiles for air-to-air or air-to-ground use.

A junior technician in *avionics* (aircraft electronics) works under the supervision of a chief technician on a Tornado.

Women are playing an increasing role in Britain's armed forces. Since 1989, the Royal Navy has allowed some of the 3,350 members of the Women's Royal Navy Service (WRNS) to serve at sea. At present, only skilled senior members of the WRNS go to sea. But it is likely that eventually all serving WRNS members will spend at least part of their career aboard ship.

Officer training. An officer in any of the four armed services is granted the *Queen's Commission.* An officer is trained to reach high standards of leadership skills and personnel management.

The Royal Navy. People who wish to become officers in the Royal Navy enlist as midshipmen at the age of $17\frac{1}{2}$ to 19 years. As well as receiving additional general education, they specialize in seamanship, or engineering, or train for the supply and secretariat branch, responsible for pay, administration, and food. After a period of up to 30 months at the Britannia Royal Navy College, in Dartmouth, Devon, midshipmen join ships of the training squadron. After a period at sea, they receive advanced shore training in their chosen specialist field.

Officers on the *general list* do not sign for any specific period of engagement. Officers on the *supplementary list* enlist for between 3 and 10 years. Many become pilots and observers in the Fleet Air Arm. The best supplementary list officers may receive permanent commissions on the general list. *Ratings* (noncommissioned sailors) who demonstrate personal qualities and professional ability may be commissioned as *special duties list* officers. Officers on the general and special duties lists can retire with a pension after completing 16 years' service from the age of 21. Officers on the supplementary list receive a *gratuity,* or sum of money, at the end of their service.

The Royal Marines. All prospective Royal Marines officers first join the Officer Training Wing at Lympstone, in Devon. They are trained at Royal Marine establishments, and also attend Royal Navy and army schools.

The army. Young men seeking a commission in the army first attend a Regular Commission Board. The board establishes if a candidate has the potential to make a good officer. Those who succeed, and who wish to make a career in the army, attend a 12-month course at the Royal Military Academy, at Sandhurst, Berkshire. A potential officer who wants only a short-service commission is trained at Sandhurst for 6 months. After they leave Sandhurst, officers join their respective regiments or corps. Then they either attend a young officers' course, or are placed under the supervision of an experienced officer or senior noncommissioned officer.

The Royal Air Force. There are three main methods of gaining a commission in the Royal Air Force: cadet entry, which includes commissioning from the ranks; the university cadetship scheme; and graduate and professional entry. Officers may enter the RAF from the age of 17. All candidates go to the Officers and Aircrew Selection Centre, for intelligence, leadership, and medical tests. Successful candidates commence officer training at the RAF College at Cranwell, in Lincolnshire.

By far the greatest number of officers serve in the General Duties Branch, consisting of a flying section and a ground section. Almost all pilots and most navigators are officers. So are many air electronics specialists, signallers, and air loadmasters.

Training for enlisted volunteers increasingly involves technical or specialist knowledge. Otherwise it varies considerably between the services.

Royal Navy volunteers, or ratings, can enlist between the ages of 16 and 33 years for specific periods of active service, such as 3, 9, or 12 years. They may reenlist at the end of their contractual service for up to a total of 22 years. Juniors enlist at 16, and receive general education and professional training ashore. Ratings enlisting for the *artificer* (technician) branch must first pass examinations, before receiving four years' craftsmanship and technical training.

Ratings alternate between sea and shore duties. Most general ratings now spend about half their time at sea. Specialists, particularly in the radar and gunnery fields, spend more time at sea. This increase in sea duty has reduced the time available for shore training and examinations, and has made it more difficult to qualify for promotion.

Royal Marine recruits usually join between the ages of $17\frac{1}{2}$ and 20. They enlist for a period of from 3 to 9 years, and join the Commando Centre at Lympstone. There is a junior entry course for 16-year-old recruits who receive educational as well as military training until they are old enough to transfer to adult service. Only the fittest gain the coveted Royal Marines' green beret. Subsequent promotion is by examination and on merit.

The army. A young man can serve for 22 years in the army. Noncommissioned officers (NCO's) in certain specialist units may serve even longer, although this is comparatively rare. Initially, most soldiers sign on for 3, 6, or 9 years. The recruit first undertakes a period of basic training at a divisional depot. Once he has learned discipline, drill, and basic soldiering, he transfers to his regiment or battalion. Since the end of World War II, British troops have served in every continent. But today's young soldier is likely to be posted within the United Kingdom (including Northern Ireland), or to Germany.

Much of a soldier's life is taken up in training to maintain efficiency. Regular weapons and fitness tests are held to maintain high standards. The soldier learns *tactics* (methods used in battle), marksmanship, vehicle maintenance, and radio procedure. The soldier takes pride in the good drill, discipline, and soldierly appearance for which the British Army is world-renowned. He learns about the battle honours and traditions of his regiment or corps.

The army encourages the young soldier to develop individual skills and self-confidence. There are opportunities for outdoor activities such as mountaineering, skiing, and parachuting. Sports of all kinds are available, and many soldiers reach the highest levels of international sports competition.

The Royal Air Force. The pilots who fly the RAF's modern aircraft depend on the skill and thoroughness of people on the ground. Volunteers in 18 groups of trades, amounting to over 150 different jobs, keep the RAF working at high efficiency. Many air force entrants find a worthwhile career to the age of 55. Others serve for between 6 and 12 years, and then find civilian jobs. Men from $16\frac{1}{2}$ to 39 years old may train for trades that include aircraft maintenance, air electronics, ground electronics and general engineering, air traffic control, ground signalling, aerospace system operating, photography, and catering. Some train for work connected with mechanical transport or marine craft, or with the dental, medical, or supply services. Others do accounting and secretarial work, or serve with the RAF police or RAF Regiment.

Aircraft engineering *avionics* (aircraft electronics) apprentices may enter the RAF between the ages of 16 and $18\frac{1}{2}$ years for three years' training. Thereafter they sign on for a minimum of 9 years.

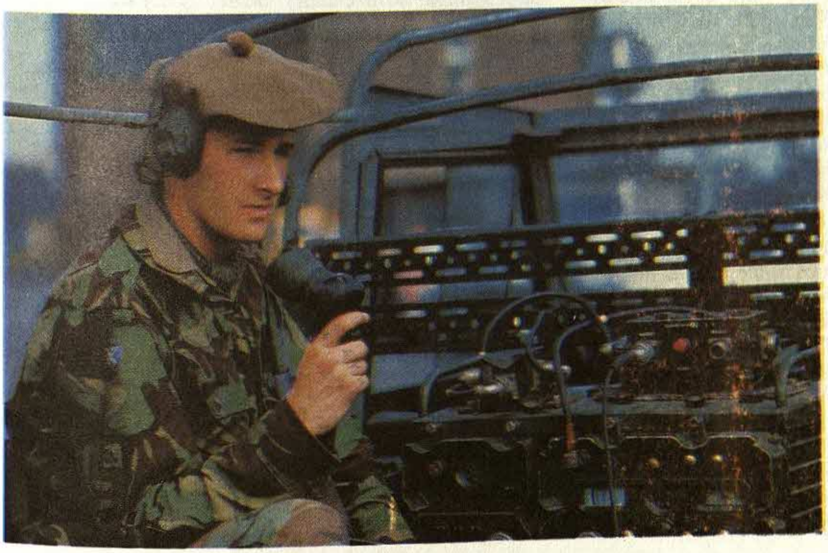
Women in the armed services. Until recently, women in the British armed services were not allowed to carry weapons, or to operate in combat zones. In 1989, the Royal Navy took the lead when it allowed members of the WRNS to serve at sea. The army has begun to accept women into a number of specialist corps.

Nursing. Each of the three main services has its own nursing corps. They are the Queen Alexandra's Royal Naval Nursing Service and the Princess Mary's Royal Air Force Nursing Service. These corps either train recruits between the ages of 18 and 28, or accept fully trained nurses. State Registered Nurses (SRN's) with sufficient experience are usually commissioned immediately.

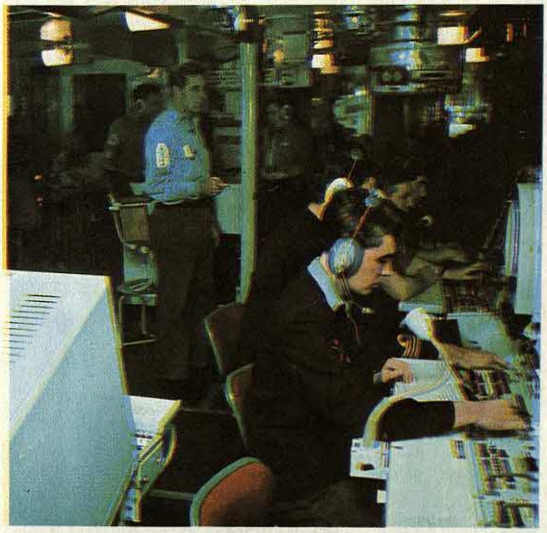
Role of women. The role of women varies from service to service. In the Royal Navy, members of the WRNS enlist between the ages of 17 and 28 years, and may serve for a maximum of 22 years. Ratings train for technical or specialist work. Graduates or professionally qualified applicants may enter direct as officers, but spend their first three months as ratings. Women with GCE *A* level examination passes may enter the WRNS as cadets, and after one year's service as ratings they may be considered for officer training. Officers or ratings may leave the service when they marry, after giving three months' notice.

Army recruits join the Women's Royal Army Corps (WRAC), and do their basic training at the WRAC Depot in Guildford, Surrey. Women with sufficient qualifications may become attached to specialist corps such as the Royal Signals, Intelligence Corps, or Royal Military Police. Others train as clerks, drivers, and telephonists and serve for two year tours with most units within the army. Until recently, all women (other than nurses) served in the WRAC. A few officers have now been accepted direct into specialist corps, notably the Royal Army Medical Corps (RAMC).

Women may enter the Royal Air Force as commissioned officers from the age of 18, or as airwomen from the age of 17. There is no separate women's service, but women in the RAF are known as the Women's Royal Air Force (WRAF). Women are not part of the regular fighting force, but train in the use of weapons so that they can carry out limited defensive duties.



Communications in the field are essential in the British Army's work. A soldier operates a radio mounted on the back of a Land Rover.



On board a guided missile destroyer, the operations room is the place from which the whole ship is controlled.

Women serve in aircrew as loadmasters, and a few women have trained as transport aircraft pilots. They may now also qualify to fly as pilots of the RAF's single-seater and two-seater jet aircraft. Women do not serve in the RAF Regiment nor in the Marine Craft Branch. Otherwise, women do the same work as men in the RAF, and follow the same courses of instruction. They also compete with men for promotion.

Control and organization

The reigning monarch is the head of the British armed forces. The secretary of state for defence, who is a government minister, heads the Ministry of Defence. This government department has its headquarters in Whitehall, London. The secretary of state presides over the Admiralty Board, which is responsible for the Royal Marines as well as the Royal Navy, and the army and air force boards. Each board is responsible for the policy, planning, control, administration, and training of its own service. Each works closely with a minister of state who answers to Parliament for all matters relating to that service. The senior military commanders are the chief of the defence staff, who is chosen alternately from the Royal Navy, army, and RAF; the chief of naval staff, who is an admiral known as the first sea lord; the chief of the general staff, who holds the rank of general; and the chief of the air staff. They are responsible to the secretary of state for the service under their control.

The Royal Navy. All activities of the fleet, at home and abroad, are under the control of the commander in chief, fleet, whose headquarters are in Northwood, west London. The commander in chief, Naval Home Command, is responsible for all naval establishments and personnel on shore in the United Kingdom, including reserve forces. Headquarters are in Portsmouth, Hampshire.

On board ship, the commanding officer is always referred to as the *captain,* whatever his actual rank. The commander of one of the larger ships, such as an aircraft carrier, holds the rank of captain. But the commanding officer of a smaller ship such as a frigate or submarine is more likely to be a commander, a lieutenant commander, or a lieutenant. When two or more ships are sailing together in convoy, the senior captain, who may not necessarily command the largest ship, assumes responsibility for overall control of the entire convoy.

The second-in-command of a naval ship is known as the executive officer, or "Number One." He is responsible for discipline and general administration. Assisted by the master-at-arms, the senior noncommissioned officer on board, he organizes the various departments.

The number of departments on board ship vary with its size and role. They normally include electrical, marine engineering, seamen, supply, and weapons. Royal Marines, when aboard, form their own department. Each department is headed by a senior officer who is responsible to the captain for efficiency, organization, and cleanliness.

The ship's *company* (crew) is organized into divisions for administrative purposes. Administration and training are the responsibility of an officer, preferably one skilled in the same specialization as his subordinates in the division.

Within a fleet, there are two types of organization, *unit* and *task.* In peacetime, the Royal Navy organizes its ships into units, or squadrons, commanded by a senior captain. A *flotilla* (small fleet) of squadrons is commanded by a rear admiral. For operational purposes, both in peace and war, the Royal Navy forms balanced forces made up of ships of various sizes carrying a mixture of weapons. These *task forces* are divided into *task groups,* which are divided into *task units.* A typical task group is commanded by a rear admiral. It may consist of an antisubmarine carrier, three or four antisubmarine frigates, three or four antiaircraft destroyers, supply ships, and perhaps one or two submarines.

For administration, the Royal Navy is divided into *branches.* The largest is the *operations* branch. This includes all antisubmarine, missile, and communications specialists. The *electrical and engineering* branch is responsible for all machinery, including ship's engines, and for technical equipment. The *supply and secretariat*

The galley is an important part of any ship. Cooks aboard the destroyer HMS *Fife* prepare to serve a meal to the crew.

Units of the British Army

Army is the historical name given to a completely integrated fighting force. An army consists of a number of corps commanded by a general or field marshal.

Battalion of infantry is made up of a headquarters company, a support company, and three or four fighting companies. It has about 650 officers and men, and is commanded by a lieutenant colonel.

Combat team is a company-sized unit, made up of a mixture of infantry platoons and armoured troops. It is the smallest independent command on the modern battlefield and is commanded by a major.

Battle group consists of a number of combat teams and is commanded by a lieutenant colonel. Usually, a brigadier divides infantry and armour under his command into three or more battle groups.

Brigade is part of a division. It has infantry, armoured, artillery, and support units. A brigade is the smallest unit which combines all ground elements, such as armoured, artillery, and engineering units, and which can maintain itself independently. It is commanded by a brigadier.

Company consists of about 120 men divided into rifle and support platoons. It is commanded by a major.

Corps is the largest independent fighting force in the British Army. It usually has three or four divisions, with its own heavy artillery, transport, and engineering support. It is commanded by a lieutenant general.

Division controls the day-to-day battle in the field. It is commanded by a major general, and has about 10,000 officers and men.

Platoon contains about 28 men and is commanded by a lieutenant or second lieutenant. Three platoons form a company. In armoured and artillery regiments, platoon-sized units are known as *troops.*

Regiment. An armoured regiment has 57 tanks and is divided into four fighting squadrons, a support squadron, and a headquarters squadron. A regiment of the Royal Artillery usually has between 18 and 24 guns. Both armoured and infantry regiments are commanded by a lieutenant colonel.

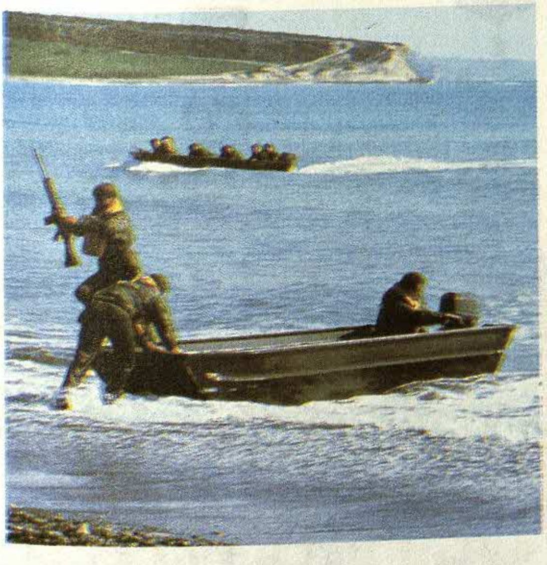
Section is the smallest fighting unit. It has eight men commanded by a corporal.

---

branch is responsible for clothing, food and general stores other than ammunition, and technical equipment and weapons. It also provides clerks and administrators for the entire navy.

The Royal Marines. A lieutenant general commands the Royal Marines, as commandant general, and has a staff in the Ministry of Defence. The commandant general administers the Royal Marines at sea and in foreign countries through the navy or army commander under whose active command they serve. He administers the Royal Marines in Britain through headquarters at Portsmouth, Hampshire, and Plymouth, Devon.

Two major generals command the Royal Marines headquarters at Portsmouth and Plymouth. Each has a number of units or training establishments under his command. Recruit, commando, and specialist training is carried out at Lympstone. Detachments for sea service, some technical staff such as carpenters and illustrators, and the Special Boat Services are trained at Poole, in Dorset. Swimmer-canoeist and landing craft techniques are also taught at Poole. Royal Marine commando units are stationed at Plymouth, at Taunton in Somerset, and at Arbroath in Scotland. Specialist units such as Comanchio Company, responsible for the protection of North Sea oil rigs, and the Mountain and Arctic Warfare Cadre spend most of their time on tough training programmes away from home.



Army troops train constantly for active duty. These Grenadier Guards are practising beach landing techniques.

The army. Organization inside the army is divided into three areas: staff, so-called *teeth arm* troops, and support elements.

A force taking part in a campaign is made up of a varying number of *corps.* A force commander is usually a general, although in time of war the commander may be a field marshal. The force commander is responsible for the planning and conduct of the campaign. The corps commanders, normally lieutenant generals, control the *tactical* battles (the individual parts of a whole battle). Each corps consists of a number of *divisions,* commanded by a major general. Divisions are divided into *brigades,* commanded by a brigadier.

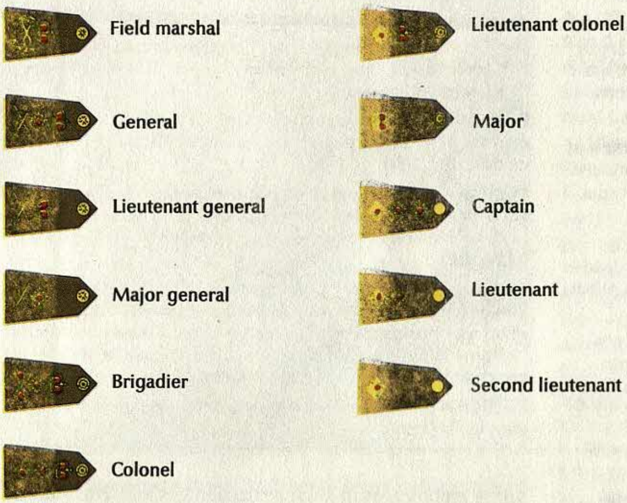
Each brigade consists of a mixture of infantry *battalions,* and armoured and artillery *regiments.* Each is commanded by a lieutenant colonel. The brigadier divides the troops under his command into varying mixtures of tanks and infantry, known as *battle groups.* A typical battle group has two companies of infantry (about 250 men) and a squadron of armour (14 tanks). Battle groups are further divided into *combat teams,* each commanded by a major.

The staff consists of officers, known as staff officers, who have attended junior and sometimes senior staff college. They have responsibility for planning operation and training. There are five basic categories, or groups, which include operations (known as G3), intelligence (known as G2), and civilian liaison (known as G5).

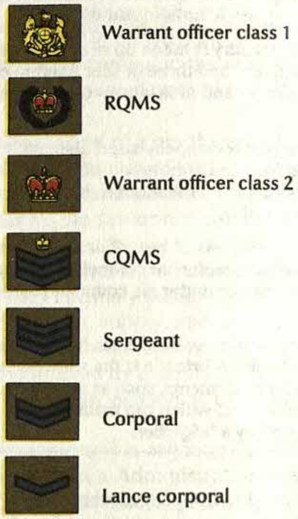
The teeth arm of the British Army includes the infantry, armoured and artillery support, the Royal Engineers, Royal Corps of Signals, and the Army Air Corps. Each unit takes pride in its heritage, traditions, and seniority.

British Army insignia

Officers

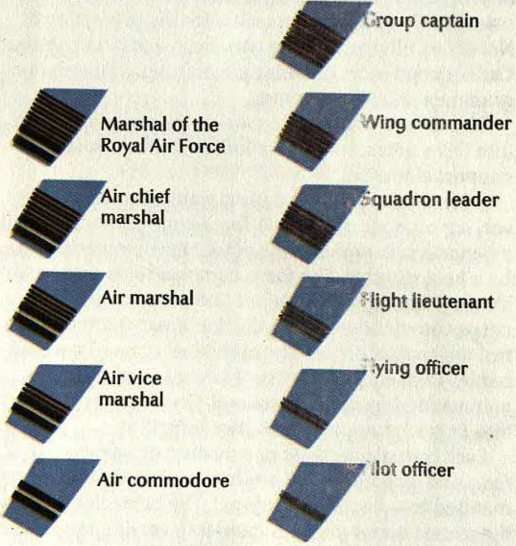


Enlisted personnel

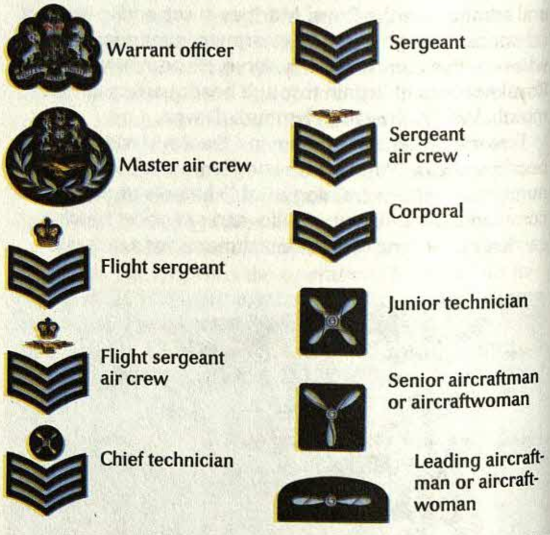


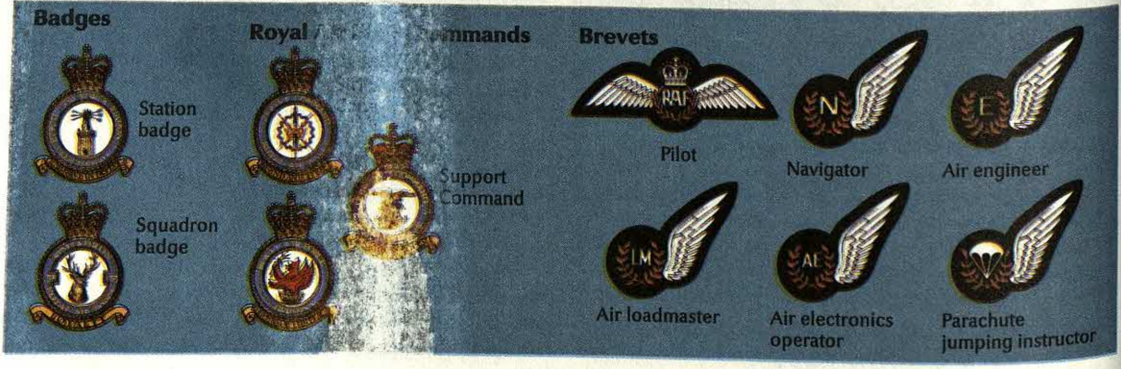
Royal Air Force insignia

Officers



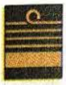
Enlisted personnel

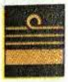


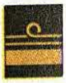


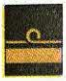
Royal Navy ranks and badges

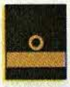
Officers

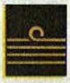

Admiral of the fleet

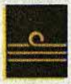

Admiral

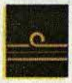

Vice admiral

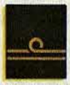

Rear admiral

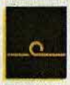

Commodore

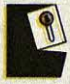

Captain

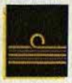

Commander


Lieutenant commander

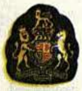

Lieutenant

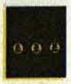

Sub lieutenant

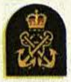

Midshipman

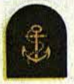

Medical service officer with commander's rank

Ratings

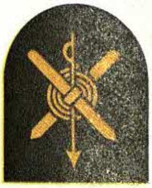

Fleet chief petty officer

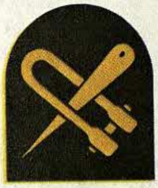

Chief petty officer

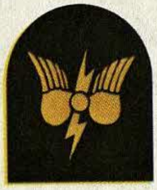

Petty officer

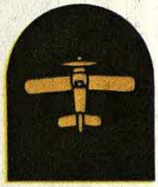

Leading rate

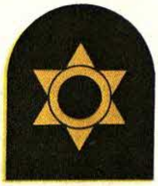
Branch badges


Sonar

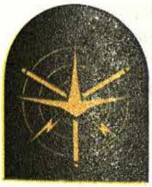

Seaman

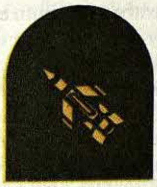

Radio operator

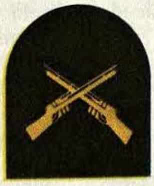

Air engineering mechanic

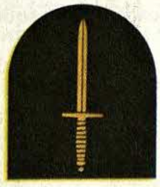

Supply & secretariat

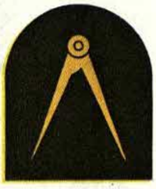
Specialist badges


Aircraft controller


Seacat aimer


Marksman


Commando


Navigators yeoman

The Royal Horse Artillery, followed by the cavalry regiments, has pride of place when parading with other units. The Household Division is made up of the Household Cavalry—the Life Guards, and the Blues and Royals—together with the five regiments of foot guards—the Grenadier Guards, Coldstream Guards, Scots Guards, Irish Guards, and Welsh Guards. These soldiers retain a ceremonial role, alongside their fighting commitments, and provide the guard for the sovereign on state occasions. All ceremonial troops in the army, except the King's Troop, Royal Horse Artillery, which has only a defensive role, are fully trained soldiers and regularly undertake conventional tours of duty alongside line troops.

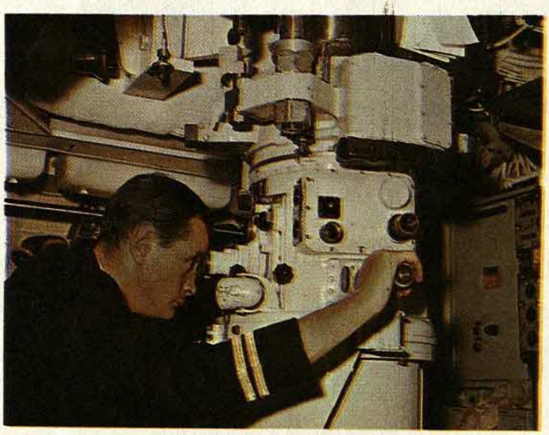
The Royal Artillery is responsible for supporting the battle with guns, mortars, and guided missiles. It ranks after the cavalry in seniority. The Royal Engineers build bridges, lay and clear minefields, and carry out demolitions, among many other duties.

The infantry includes many famous regiments. Some, such as the Royal Scots, are more than 350 years old. Today, most infantry battalions are mechanized. Soldiers no longer march on foot, as infantry traditionally did, but travel in tracked armoured personnel carriers.

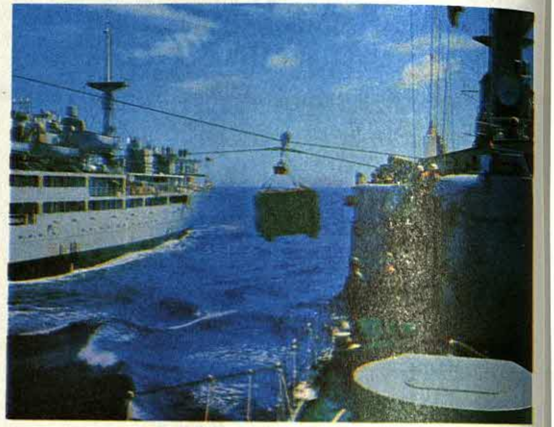
The support elements consist of many corps with a diversity of responsibilities. The Royal Army Ordnance Corps is responsible for weapons and supplies. With the Royal Engineers, it is also responsible for bomb disposal. The Royal Corps of Transport moves the Army and its equipment. The Royal Electrical and Mechanical Engineers repair and maintain equipment. The Royal Pioneer Corps builds and maintains fortifications and other military constructions. It provides close-quarter protection for senior officers in the field.

The Royal Air Force. The main divisions of the RAF are *commands.* Strike Command controls all the RAF's home-based operational aircraft. No. 1 Group controls all defensive, transport, battlefield support, and surface-to-air missile units. No. 11 Group controls all air-defence forces. No. 18 Group controls all maritime reconnaissance and all air-sea rescue units based in Britain.

Support Command controls all RAF flying schools, including university air squadrons. It also maintains technical training facilities.



Submarines require special equipment. An officer in a submerged submarine uses a periscope to look outside the ship.



Spells of duty at sea can last for several months. Vessels often have to take on supplies and fuel from *support ships.*

Outside the UK, Strike Command controls RAF aircraft based in Cyprus, the Falkland Islands, Belize, and Hong Kong. The Royal Air Force, Germany, is the United Kingdom's European-based contribution to NATO.

The main division inside each command is called a *group.* Each *group* controls units at several airfields. Each airfield has one or more *squadrons.* The size of a squadron depends on its role. A squadron of strike aircraft generally has 12 aircraft divided into two *flights.*

The names of ranks in the RAF do not indicate an officer's appointment. A group captain may not command a group, nor a squadron leader lead a squadron. Indeed, many flying officers do not actually fly.

Communications. The Royal Navy has ships stationed in every part of the world, and so has the greatest need of efficient communications. The Naval Radio Communication organization uses radio and television to make this worldwide communication possible. The Ministry of Defence works closely with British Telecom (BT), the UK's largest telecommunications organization.

Naval ships at sea can communicate with one another or with merchant ships and aircraft by radio, either direct or through a communications satellite. However, flashing lights or flag signals are still used for close range messages or during periods of "radio silence." See **Satellite, Artificial; Signalling.**

Modern naval weapons include Seacat guided missiles. They may be used against many vessels or aircraft.

Naval ships and aircraft (both RAF and Fleet Air Arm) rely heavily on *radar* (see **Radar**). At night or in fog, radar can show the presence of other aircraft, ships, harbour entrances, and landing strips. In wartime, it can reveal the position of enemy shipping and aircraft. Some guided missiles use radar to "home in" on their targets.

The army is land-based and less mobile, and so has less difficulty than the Royal Navy with communications. Every unit of brigade size and larger has its own communications centre. This centre can receive and send signals to every other major unit in its area of operation. Signal messages received from higher command are relayed to subordinate units. Every mechanized company, tank, armoured reconnaissance vehicle, and artillery battery has its own radio, so it can receive up-to-date orders with the minimum of delay.

Rank and insignia

Officers and noncommissioned officers of the Royal Navy, army, and Royal Air Force wear different badges of rank. The Royal Marines, despite their close ties with the Royal Navy, wear army badges of rank.

Army officers wear rank badges on their shoulders, but officers in the other services wear them on their lower sleeves. Warrant officers in the army and RAF, and chief petty officers and high ranks in the Royal Navy, wear their rank on their lower sleeves. Junior noncommissioned officers of all services wear their rank insignia on their upper sleeves.

Weapons and equipment

The Royal Navy has three light aircraft carriers, two assault ships, a number of frigates, destroyers, and submarines, and a small fleet of minesweepers and minehunters.

Assault ships. All frigates and larger vessels have helicopter landing facilities. The two commando assault ships are specially designed for helicopter landing operations. They also hold four large assault landing craft, which are floated in a specially constructed basin within the ship before being launched, laden with troops, into the sea for an amphibious landing.

Royal Marines prepare for battle by participating in training exercises that simulate combat conditions, *left.* Since 1664, marines have fought in every major naval battle involving British forces.

Frigates and destroyers are the most numerous warships. These ships are designed for antiaircraft or antisubmarine duties. They are fitted with a combination of Seacat, Seadart, Seaslug, or Seawolf guided missiles (see **Guided missile**). Some are armed with Exocet sea-skimming antiship missiles. Others carry one or more conventional quick-firing guns (see **Destroyer; Frigate**).

Submarines. Most of the Royal Navy's submarines are nuclear-powered and can stay at sea for months. Most carry torpedoes. They use their *sonar* detection equipment to detect enemy submarines (see **Sonar**). The Royal Navy has four Polaris missile submarines. These will be replaced by much larger submarines capable of firing the long-range Trident II with a nuclear warhead.

Minehunters and minesweepers are small ships which locate and destroy enemy mines. Modern minesweepers are built of plastic and glass, so they are safe from magnetically operated mines which are set off by metal.

The Fleet Air Arm has Sea Harrier VTOL (Vertical Take-Off and Landing) jet aircraft. These planes operate from the three carriers. The navy also has seven types of helicopter for use in antisubmarine, transport, and other roles.

The Royal Marines use army infantry weapons such as rifles, machine guns, mortars, and light antitank weapons. They also have their own artillery regiment. The Marines can call upon the support of gunfire from Royal Navy ships when operating close to shore.

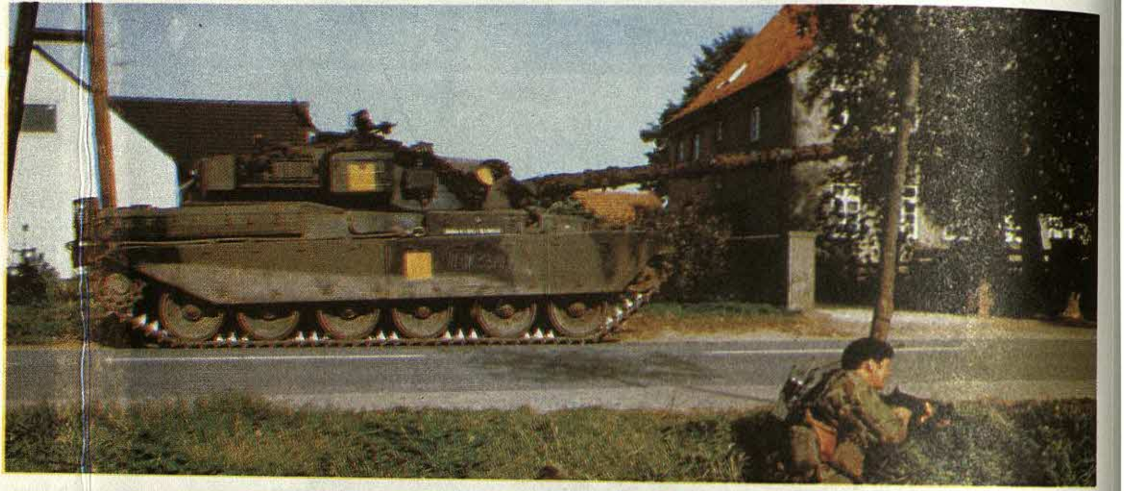
The army. Weapons used by the army are mostly light, and easily carried. The infantry's latest rifle is the SA-80 automatic rifle, which replaces the SLR semiautomatic rifle. A new light support weapon is taking the place of the general purpose machine gun. Both weap-

Infantry troops use armoured personnel carriers to move into combat areas.

Military police on a search mission check their position on a map.

Combat troops use both ground-to-ground and ground-to-air missiles.

The armed services in action



Armoured troops use such main battle tanks as the *Chieftain.* Soldiers stationed in Germany use tanks in practising various manoeuvres during regular military exercises.

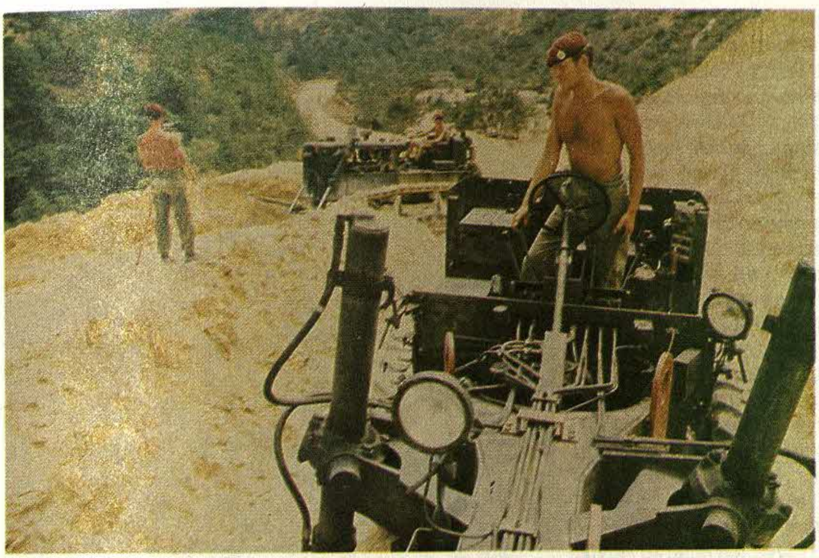
A Harrier pilot is helped into his cockpit during training. Both personnel wear the protective clothing that they would wear in the event of nuclear, biological, or chemical attack.

ons fire 5.56 mm ammunition, which is light and extremely accurate. Antitank weapons include the 60 mm light antitank weapon, or LAW, the Milan missile, and the medium antitank weapon, or MAW.

The Royal Artillery has four regiments with 105 mm Abbot self-propelled guns, but most of its fire power is provided by American-built 155 mm M-109A2 self-propelled guns. A number of regiments use the towed 155 mm FH-70 gun, and the 105 mm light gun. Two "depth-fire" regiments are equipped with the American MBRL rocket, which can hit targets at ranges of over 40 kilometres. The artillery is also to have a new self-propelled gun, the SP-90.

Vehicles used by the army range from motorcycles and trucks to Challenger tanks. The Challenger is one of the most powerful tanks in the world. It weighs 62 metric tons fully laden and is armed with a 120 mm main gun, and two 7.62 mm machine guns. It has a crew of four, can fight in almost any conditions, and has a road speed of 60 kilometres per hour. See Tank.

The Harrier jet is a vertical takeoff and landing craft designed for support of ground troops. It can take off from a road, *left,* and can fire rockets, *right,* from beneath its wings.



Sappers perform such jobs as building roads, airstrips, or bridges in jungle areas, often working under simulated combat conditions.

Puma helicopters hover as they unload supplies into a clearing. The Pumas are versatile in delivering RAF regiment men to battlefields, and providing supplies for them.

A Sea King helicopter patrols near the coast in training for search and rescue work. The RAF is often called in to provide rescue services in civil disasters at sea.

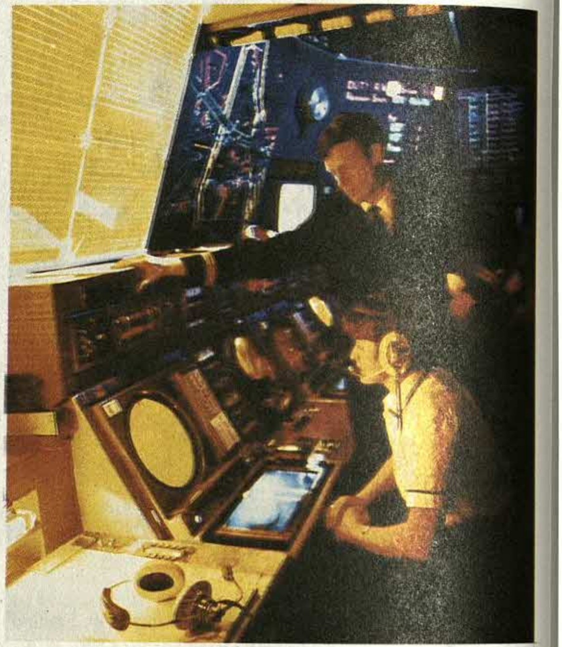
Other *armoured vehicles* used by the army include the CVR(T) series, based on the Scorpion reconnaissance vehicle, the Fox reconnaissance vehicle, and the FV432 troop carrier. The Warrior is an armoured troop carrier with a 30 mm Rarden cannon, and represents a new design in armoured personnel carrier. It can carry a section of soldiers into battle, and can fire its powerful gun in close support.

Observation and communications. The British Army's observation and communication equipment is among the best in the world. Light helicopters, such as the Gazelle and Lynx, are used for transport and against tanks. Much radio equipment is portable. Radar is used to pinpoint the position of enemy guns.

The Royal Air Force uses a wide variety of aircraft. Many modern military aircraft are multirole, and can be used as bombers, fighters, or for reconnaissance.

Attack/strike aircraft are armed with nuclear or high-explosive gravity bombs. These planes are being re-equipped with stand-off missiles, which can be fired hundreds of kilometres distant from the target. The swing-wing Tornado GRI aircraft, which entered service in the early 1980's, can attack at high or low altitude, and in all weathers. Closely following the contours of the land, it uses electronic jamming devices to avoid detection by enemy radar. The Buccaneer, originally designed for naval use, is effective against land and sea targets. Flying at very low altitude, this twin-engined, two-seat jet can carry 7,250 kilograms of bombs, nuclear weapons, or antiship missiles. The Harrier STOVL (Short Take-Off and Vertical Landing) aircraft is used for close support of ground troops. It can operate in advance of its main base, taking off from roads, fields, and clearings in woods. Harriers can be hidden inside buildings or beneath camouflage nets, and need no runways. Harriers carry bombs, guns, and antitank rockets.

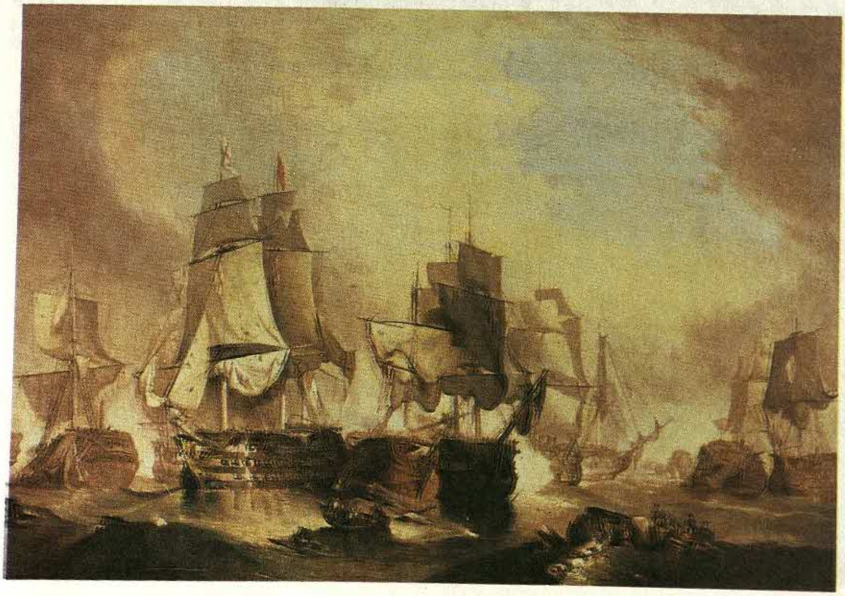
Air defence. For air defence, the RAF uses F4 Phantoms (being withdrawn), and more advanced Tornado F3's. These fast, heavily armed aircraft carry air-to-air missiles for use against enemy aircraft.



Operating radar is a skilled job that requires great concentration from the servicemen and servicewomen who do it. The operator above is working in a naval radar station.

Reconnaissance. For reconnaissance, the RAF uses Canberras, Jaguars, and Harriers. These aircraft are fitted with high-resolution cameras and other equipment to photograph potential targets. Such aircraft would be vulnerable to enemy attack in the time of war, and will be replaced by pilotless *drones* (automatically controlled aircraft).

Flight refuelling tankers are used to extend the range of other aircraft by refilling their fuel tanks in the air. The RAF uses Victors, VC10's, and Tri-Star aircraft as tankers.



At the Battle of Trafalgar, the Royal Navy won one of its most famous victories. Lord Nelson, Britain's greatest naval hero, was killed in the battle on October 21, 1805.

Disciplined troops of the British Army won great victories in such battles as Waterloo (1815), *above.* Wellington's army had been a unit during the Peninsular War (1808-1813).

Fuel flows through a hose from the tanker aircraft into a probe on the receiving aircraft.

Maritime patrol Nimrod aircraft operate from shore bases. They can track submarine and surface ships, and do air-sea rescue work, dropping life rafts, food, and other supplies to survivors.

Transport Command has one of the most crucial roles in the RAF. Its fleet of Tri-Stars and VC10's carry personnel of all four services around the world. C-130 Hercules transport planes move all the heavy goods needed by the services. The Hercules can carry paratroops if required. The aircraft has a very long range and operates safely from rough airstrips. Chinook, Puma, and Wessex helicopters supply troops and stores to the battlefields, and evacuate casualties. Sea King and Wessex helicopters are used for rescue work, both over land and at sea.

Training. RAF pilots learn to fly in various types of training aircraft, including Bulldogs, Jet Provosts, and Tucanos. Pilots who will fly high-performance jets receive further training on Hawk advanced trainers. For all types of RAF aircraft there is a *simulator,* and pilots learn the basic skills on this artificial ground trainer before flying a real aeroplane.

Missiles. RAF interceptor and strike aircraft carry missiles for ground, sea, and air attack. Certain air-to-air missiles (AAM's) are *heat-sensitive* and find their targets by locking onto the hot exhaust gases from an enemy aircraft. Other missiles are controlled by radar. Most RAF aircraft carry a variety of long-range AAM's, such as Sparrow and Skyflash, and shorter-range AAM's, such as Sidewinder. The Buccaneer can carry either the antiradar Martel air-to-surface missile (ASM) which homes onto enemy stations, or television-guided Martels, which can be guided in flight to attack enemy ships. The RAF Regiment protects airfields and ground installations with low-level Rapier and high-level Bloodhound surface-to-air missiles (SAM's).

History

The oldest of Britain's services by far is the Royal Navy. Henry VIII was the first English king to commission purpose-built warships, although the origin of the English navy can be traced back to the reign of Alfred the Great. Queen Elizabeth I inherited some of Henry's warships but, because she had to pay for their upkeep, she preferred to use armed merchant ships owned by her subjects. In 1588, despite the relatively small size of the Elizabethan navy, English ships defeated the Spanish Armada. See **Spanish Armada.**

Between 1634 and 1641, King Charles I built a small navy by collecting a local tax known as *ship money.* Oliver Cromwell increased the navy from 40 ships to over 200, placing its control under two parliamentary committees, called the Navy Commissioners and the Admiralty Commissioners. After Charles II was restored to the throne in 1660, the navy was known as the Royal Navy.

When cannon became the main shipboard weapons, every maritime nation strove to build bigger and faster ships. In 1600, the largest British warship displaced only 400 metric tons. Bigger ships were steadily built, and by 1800, 100-gun ships-of-the-line were a common sight. The *Albions,* the last all-wooden ship, displaced some 3,000 metric tons.

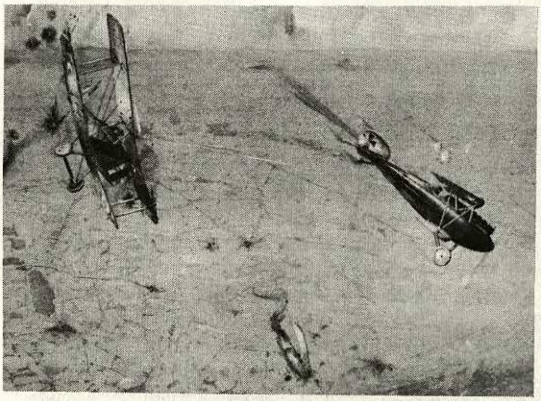
In the 1700's, Admiral Lord Anson first successfully classified British warships. He placed them in descending order of classes from I to VI according to their tonnage, speed, and guns.

The British Army had its origin in the English Civil War of 1642 to 1646 when the Parliamentary forces of Oliver Cromwell defeated the Royalists of King Charles I. Cromwell's soldiers, or "ironsides," mainly East Anglian farmers and labourers, were Britain's first properly disciplined fighting troops. Previously, permanent military forces had been extremely small. They consisted of the King's Bodyguard, the Gentlemen Pensioners, the Yeomen of the Guard, and the garrisons for a few castles and forts. When the king needed greater forces, he called upon his feudal lords, or later towns, to organize and provide troops.

Charles II introduced a permanent *standing army* in 1660, but development was slow. The Grenadier Guard regiment was formed from ex-Royalist forces of the Civil War. The Coldstream Guards and the Royal Horse Guards were formed from Parliamentary forces.

James II raised several new regiments during the Duke of Monmouth's rebellion in 1685. More regiments were added during wars with France. By 1704, when the Duke of Marlborough defeated the French at Blenheim, the Army had grown to a considerable size.

The Royal Marines. From medieval times, British soldiers had served on board ship, both as boarding parties and sharpshooters, and to make landings on enemy shores. In 1664, Charles II ordered the creation of a specially trained regiment for service with the fleet. The regiment was named the Duke of York and Albany's Maritime Regiment of Foot, but became known as the Marines. In 1704, a mixed force of seamen and marines under Admiral Sir George Rooke (1650-1709) captured Gibraltar. This gave the marines the only battle honour to be depicted on their colours. In 1802, George III granted the marines the title *Royal.*



In World War I, pilots of the newly formed Royal Flying Corps took part in many dogfights over the western front.

Development of the services. During the 1700's and early 1800's, each of the services developed its tactics, logistics, and support. In 1740, Admiral Vernon introduced more flexible tactics into naval campaigns by freeing his commanders from the need to keep their ships in line during battle. His changes paved the way for the victories of Admiral Horatio Nelson, particularly that at Trafalgar (1805), when the Royal Navy sailed directly for the French and Spanish centre, splitting the enemy line in two. In 1776, the Royal Navy produced its first signal book, enabling long-distance communications with the assistance of flags and pennants.

The Duke of York, when commander in chief of the army, and Sir John Moore, the victor at the Battle of Corunna (1809), introduced a more enlightened spirit into training, even removing the hated goose-step. They built up the army, which the Duke of Wellington led to victory in the Peninsular War (1808-1814) and at the Battle of Waterloo (1815).

During the 1800's, Britain fought a series of colonial wars, but was rarely involved on the European mainland. The Crimean War (1853-1856) proved to the military leaders that Britain's military supremacy was now in doubt (see **Crimean War**). A number of reforms were introduced. The navy was modernized, passing from the age of wood and sail to that of iron and steam.

In 1870, Viscount Cardwell reorganized the army. County regiments were introduced, and standards of health and education were improved. The lash as a punishment was banned. In 1906, Lord Haldane introduced the General Staff. In 1907, the Territorial Army was formed. Haldane created the potential for an *expeditionary force* of six infantry and one cavalry divisions. The German *Kaiser* (Emperor) Wilhelm II referred to the British Army in 1914 as the "old contemptibles." But thanks to Haldane's reforms, the army fought well. It was reinforced by the territorial battalions during the early stages of World War I (1914-1918). Conscription was introduced in 1916. Field Marshal Lord Kitchener built the army into the largest military force ever to leave the shores of Britain.

Parliament passed the Navy Act in 1896. It authorized the building of 70 ships. The *Dreadnought* (1906) was the world's first modern battleship. By 1914, Britain had 60 battleships and 100 cruisers. The Royal Navy boasted by far the largest fleet in the world.

Military aviation. Britain's first military flying unit was formed in 1878. It had five observation balloons, manned by volunteers from the Royal Engineers. The army used balloons in the Second Anglo-Boer War (1899-1902). In 1908, S. F. Cody, an American, built an aeroplane for the Royal Engineers. Known as *British Army Aeroplane No. 1,* it made the first recognized powered flight in Britain.

In 1911, a small group of Royal Navy and Royal Marines officers learned to fly, planning to form a naval aviation unit. Soon after, the Balloon Section of the Royal Engineers became the Air Battalion. On April 13, 1912, all military flying in Britain came under the Royal Flying Corps (RFC). RFC had separate naval and army wings. In 1914, the naval wing became the Royal Naval Air Service, controlled by the Admiralty. The RFC became entirely an army service. At the start of World War I, it had 105 officers, 63 aeroplanes, and 95 motor vehicles.

Events in 1917 and 1918 led many people to demand a reorganization of military flying. These events included the German bombing raids on London in June and July 1917, and the slow production of British fighter aircraft. As a result, on April 1, 1918, the RFC and the RNAS were combined to create the Royal Air Force, the world's first major independent air service. At the end of World War I, the RAF had 22,171 aircraft, 291,652 serving personnel, 263 squadrons, and 15 flights.

World War II. Between the world wars, the British armed forces were reduced in strength. Few politicians called for large military forces and, at the outbreak of World War II in 1939, the army and air force were not

The Battle of Britain in 1940 was a decisive stage of World War II. Pilots of RAF Fighter Command defeated a much larger force of German bombers, and prevented an invasion.

RAF Rapier missiles are fired from a mobile launcher. Rapiers were used in the 1982 Falklands War, in which the RAF played an important part.

prepared for modern warfare. Fortunately, the government had built modern warships. The UK had the largest fleet in the world.

During World War II, Royal Marines units fought in virtually every major battle. They took part in the raids on St. Nazaire and Dieppe, and provided over 10,000 men for the Allied D-Day landings in northern France on June 6, 1944.

The army fought in campaigns in every continent. Under General Montgomery, the 8th Army defeated the Germans, led by Rommel, in North Africa. General Slim led the 14th Army to victory against the Japanese in Burma. Between June 1944 and the end of the war in 1945, UK troops played a major part in Western European campaigns that led to the defeat of the German dictator, Adolf Hitler.

When the RAF entered World War II, it was a small, professional force. In 1940, its finest hour came when RAF fighter pilots, described by Winston Churchill as "the Few," defeated the German *Luftwaffe* in the Battle of Britain. As the war progressed, Bomber Command made massive night bombing raids over Germany and German-occupied Europe.

The armed forces today. After the war, the UK's armed forces were reduced in size. They were redesigned to meet a new threat from the Soviet Union and its allies (see **Cold War**). In the 1950's, the three main services were equipped with nuclear weapons. Today, such weapons are almost exclusively under the command of the Royal Navy.

The United Kingdom has fought several small wars since 1945, particularly in the Far and Middle East. Also, since 1969, it has deployed armed forces on security duties in the fight against terrorism in Northern Ireland. In 1982, units of all the forces took part in the campaign to recapture the Falkland Islands from Argentina.

The Ministry of Defence realized the need for the creation of a "fire-force" which could react speedily to an emergency anywhere in the world. In 1991, British armed forces fought in the Persian Gulf War as part of the multinational force, following Iraq's invasion of Kuwait. The units included RAF 2 Tornados and Jaguars, Royal Navy warships, and Army Challenger tanks. In 1993, the UK government announced large cutbacks in the armed services.

Related articles in *World Book* include **Air force; Army; Marine;** and **Navy.** See also the following articles:

Alexander of Tunis
Alfred the Great
Anglo-Boer Wars
Battle of Britain
Crimean War
Cromwell, Oliver
Dowding, Lord
El Alamein
Haig, Earl
Hawkins, Sir John
Jellicoe, Sir John
Kitchener, Horatio H.
Marlborough, Duke of
Monk, George
Montgomery, Bernard
Moore, Sir John
Mountbatten, Louis
Nelson, Horatio
Persian Gulf War
Press gangs
Seven Years' War
Ship money
Tank
Wavell, Archibald P.
Wellington, Duke of
Wolfe, James
World War I
World War II

Outline

I. The four services
  A. The Royal Navy
  B. The Royal Marines
  C. The British Army
  D. The Royal Air Force (RAF)
II. People in the armed services
  A. Recruiting and personnel
  B. Officer training
  C. Training for enlisted volunteers
  D. Women in the armed services
III. Control and organization
  A. The Royal Navy
  B. The Royal Marines
  C. The army
  D. The Royal Air Force
  E. Communications
IV. Rank and insignia
V. Weapons and equipment
  A. The Royal Navy
  B. The Royal Marines
  C. The army
  D. The Royal Air Force
VI. History

Questions

What functions do the Royal Marines perform?
Which war produced Britain's first properly disciplined troops?
Under what circumstances does the navy employ a *task force?*
What is the difference between a company and a platoon?
Which group of servicemen and women are known as *ratings?*
What rank of officer commands an army regiment?
Which is the oldest of the UK's armed services?
How has the role of women in the armed services changed since 1989?
What skills do soldiers learn while they are training?
Which units form the *teeth arm* troops of the army?

John Constable painted many views of the English countryside. This painting, *Salisbury Cathedral and Archdeacon Fisher's House from the River,* shows his interest in the effect of light and shadow on the landscape.

National Gallery, London

Arts of the United Kingdom

United Kingdom, Arts of the. The United Kingdom has a rich and varied artistic tradition. England, Northern Ireland, Scotland, and Wales all contribute to a distinctive national heritage in the arts.

This article describes how the arts are organized in the United Kingdom, through such bodies as the Arts Council. This article deals with painting, sculpture, music, opera, ballet, and theatre. For more about literature, see the articles **English literature; Irish literature; Scottish literature; Welsh literature.**

Arts councils

The arts councils are the main agency through which government encourages and supports the arts in the United Kingdom. There are arts councils for Great Britain (England, Scotland, and Wales), and for Northern Ireland. Each council receives a government grant and, in turn, makes grants to help to pay for musical, theatrical, and other artistic activities. Many local government areas have arts councils to coordinate and finance local arts activities.

The Arts Council of Great Britain consists of 20 honorary members appointed by the minister for arts. Arts councils for Scotland and Wales are autonomous committees of the Arts Council. Activities supported by the Arts Council include opera and ballet, music, theatre, art, and literature.

The Arts Council gives support to major opera and ballet companies, such as the Royal Opera House, Covent Garden, London; English National Opera; Opera North; the Welsh National Opera Company; the Scottish Opera Company; the Rambert Dance Company; and the Scottish Ballet. The work of the council helps to bring opera and ballet to provincial districts.

In music, the Arts Council helps to subsidize certain symphony orchestras, such as the Bournemouth Symphony Orchestra, the City of Birmingham Symphony Orchestra, the Halle, the London Philharmonic, the London Symphony, the Royal Philharmonic, and the Philharmonia.

The Arts Council supports the Royal National Theatre, the Royal Shakespeare Company, the English Stage Company, and many repertory companies and theatres. It also sponsors training schemes for writers, producers, designers, and administrators. The council sponsors exhibitions of paintings, drawings, and sculpture in many parts of Britain.

The Arts Council makes grants to some writers. It also makes grants to bodies that promote good literature, such as the Book Trust and the Poetry Society.

The Arts Council of Great Britain was formed in 1946 from the earlier Council for the Encouragement of Music and the Arts (1940).

The Arts Council of Northern Ireland has 16 members. It receives an annual grant from the Northern Ireland Department of Education, plus contributions from local authorities.

Painting

Painting in the United Kingdom has been generally influenced throughout its history by the development of painting in other European countries. British artists have affected painting in other countries much less. But pictures by painters such as John Constable, Thomas Gainsborough, and George Stubbs have been greatly admired. Since World War II (1939-1945), the work of such artists as Ben Nicholson, Graham Sutherland, and Francis Bacon has become internationally esteemed.

Various societies and institutions organize exhibitions of paintings throughout the United Kingdom. In London, the Royal Academy of Arts has an annual summer exhibition of paintings by contemporary artists, and stages major exhibitions, usually of the art of particular periods, at other times of the year. National galleries in Edinburgh and London have permanent displays including the works of British artists. The Tate Gallery in London has a large collection of works of British artists since the 1500's. The Tate Gallery in Liverpool shows mainly paintings of the 1900's.

A semiofficial organization called the British Council promotes the work of British artists in other countries (see **British Council**). The Arts Council of Great Britain arranges exhibitions of British and European painting in Britain. In the past, kings and nobles helped painters by giving them their patronage. For example, King Charles I was one of the most enlightened patrons in Europe.

Characteristics. British painting today reflects artistic developments in other countries more than at any other time. But it also preserves many national characteristics. British art has a long tradition of landscape painting, especially romantic scenes, and of watercolour painting. Refinement and delicacy are two notable characteristics of British painting. These qualities can be seen in the work of many British artists, such as Paul Nash, Ben Nicholson, and Ivon Hitchens. Abstract art is popular today. But the traditional interest of British painters in representational painting and realism has remained, and is generally stronger than in other countries. Contemporary representational painting shows the artists' reaction to life and things around them. John Bratby shows life as tough and ugly. Francis Bacon's work suggests subconscious terrors. Throughout the history of British painting, artists have focused not only on the artistic aspects of their work, but also on the expression of feeling.

History. ***The Middle Ages.*** Illuminated manuscripts, mural painting, and panel painting were important forms of art in England from early times. Canterbury, Kent; St. Albans, Hertfordshire; Winchester, Hampshire; and, later, Westminster, London, were important artistic centres in the Middle Ages.

An outstanding medieval work is the *Winchester Bible* made by a brilliant group of artists in the 1100's. About 1260, an artist of St. Albans may have painted the *Chichester Roundel,* a wall painting in the Bishop's Chapel at Chichester, Sussex. This little masterpiece is a tender portrait of the Madonna and Child. About 1395, an unknown artist of Westminster painted the *Wilton Diptych,* a panel painting in the late Gothic style. It is of the French school, elegant in design, lyrical in colour, and almost as tender in feeling as the *Chichester Roundel.*

In the 1400's, painting in England declined, partly as a result of the *Black Death* (see **Black Death**). But a series of wall paintings in Eton College Chapel, Berkshire, painted by William Baker between 1479 and 1488, are examples of the artistic achievements of this period. Baker gave his subject, the miracles of the Virgin Mary, a vigorous and severe treatment. His style has the simple graciousness and dignity that typified the best English art of the Middle Ages.

The 1500's and 1600's. Political, social, and religious events of the Reformation interrupted the continuous development of traditional English art. During this period, many paintings dating from the Middle Ages were destroyed.

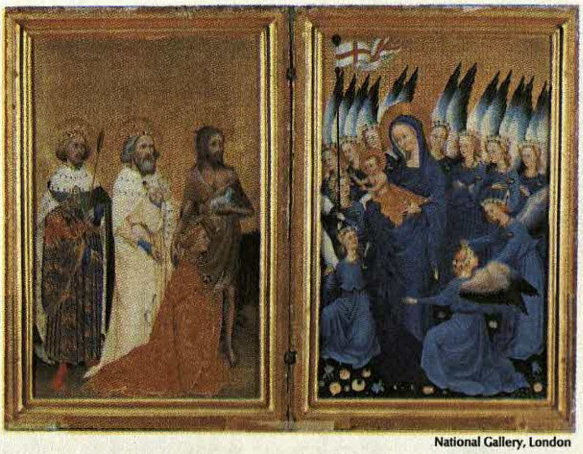
In the reigns of Tudor and Stuart monarchs, the most common form of painting was portraiture, especially flattering paintings for members of the newly created, wealthy middle class. The most outstanding English-born artist was Nicholas Hilliard (1547-1619), who painted *miniatures* for Queen Elizabeth I. William Dobson (1610-1646), serjeant painter to Charles I, was another gifted artist. But for about 200 years, most portraits were painted by visiting artists from other countries, particularly the Netherlands. Official court painters from continental Europe included Hans Holbein the Younger, Sir Anthony Van Dyck, Sir Peter Lely, and Sir Godfrey Kneller. Peter Paul Rubens also worked in England in 1629.

Literature was flourishing at this time, but painting by native artists was mysteriously in decline. Even the art of such masters as Van Dyck and Rubens failed to revive English painting.

The 1700's. English and Scottish painting revived in the 1700's, because the choice of subjects widened, and because of the work of William Hogarth (1697-1764). Hogarth was an outstanding and original artist. He paid great attention to the purely artistic aspects of his work. But, in his series of satirical and descriptive paintings of English life, Hogarth also expressed his wit, sense of drama, and moral convictions.

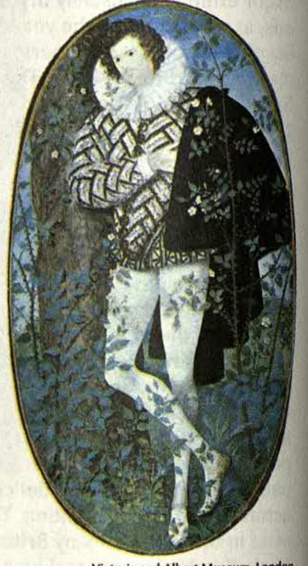
Artists of the 1700's no longer painted only portraits of aristocrats. They developed forms that earlier artists had begun, such as landscapes, sporting pictures, and mural decorations. For example, in the 1600's, Robert Streter (1624-1679) had painted the ceiling of the Sheldonian Theatre in Oxford. But his achievement was surpassed by Sir James Thornhill (1675-1734), an outstanding mural painter. Thornhill's vigorous baroque style can be seen in the Painted Hall at Greenwich, London. In the 1600's, Francis Barlow (1620?-1704) painted many excellent animal studies. But the later artist George Stubbs (1724-1806) was one of the greatest animal painters in the world. He was particularly known for his paintings of horses. Like his successor James Ward (1769-1859), Stubbs also showed a deep understanding of landscape painting. Another painter of this period, George Morland (1763-1804), also painted animals, but is remembered mainly as a landscape painter.

In the 1700's, the chief development in British art was in landscape painting. Landscape as a separate art emerged slowly in European painting generally, and even more slowly in British painting. People of taste liked landscapes in the Italian style, such as the peaceful classical scenes of the French artist Claude. But, in the work of Richard Wilson (1714?-1782), British landscape painting became a mature art. In his paintings, Wilson combined his classical serenity and sense of design with an interest in light and atmosphere. His work greatly influenced such later artists as John Crome, John Constable, and J. M. W. Turner.



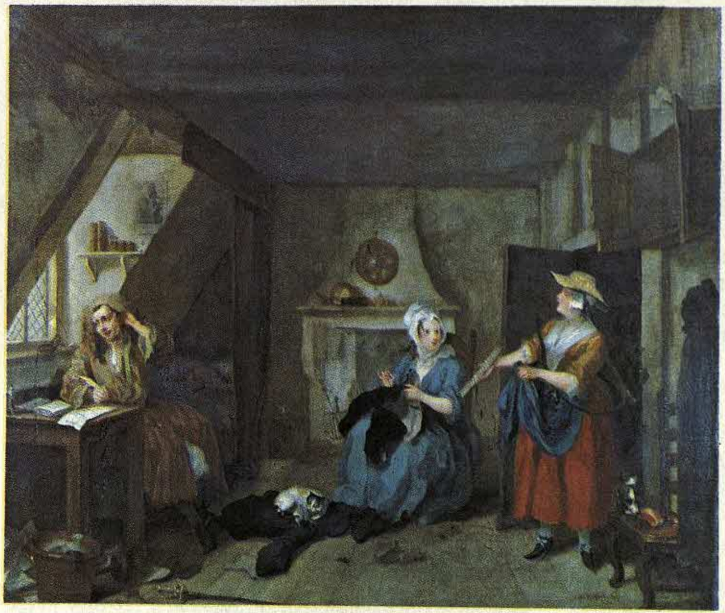
The Wilton Diptych
by an unknown artist of the 1300's

National Gallery, London



Victoria and Albert Museum, London

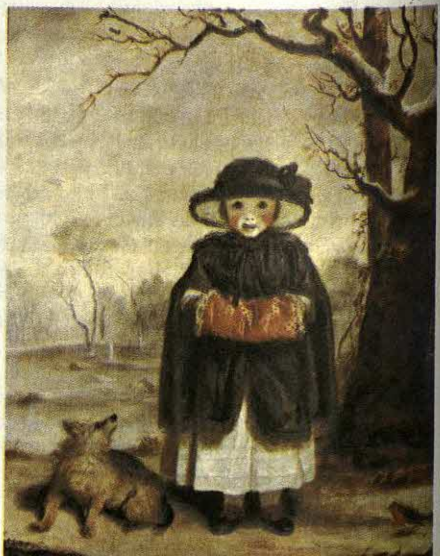
Portrait of a Young Man
(miniature) by Nicholas Hilliard

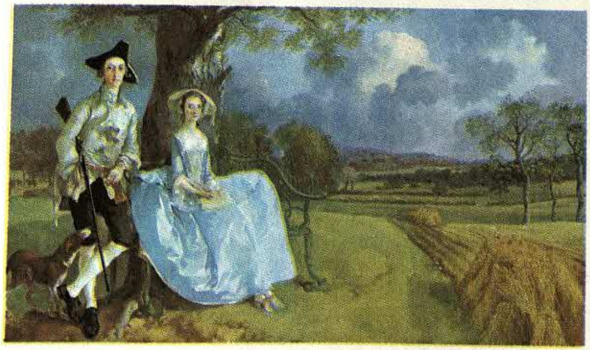


City Museum and Art Gallery, Birmingham

The Distressed Poet
by William Hogarth

Lady Caroline Scott
by Sir Joshua Reynolds

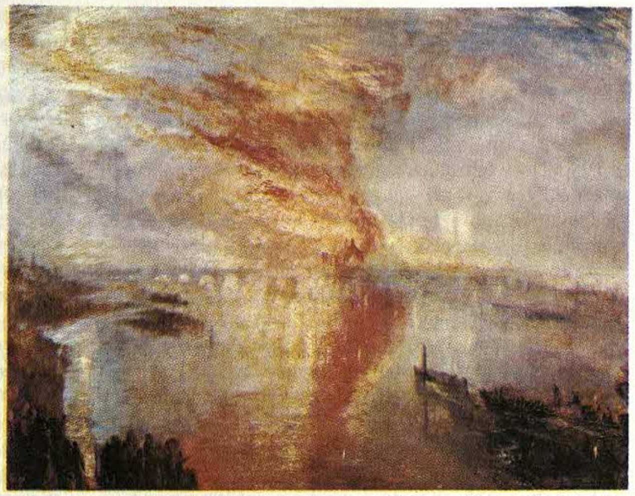




National Gallery, London

Mr. and Mrs. Andrews
by Thomas Gainsborough

Burning of the Houses of Parliament
by J. M. W. Turner

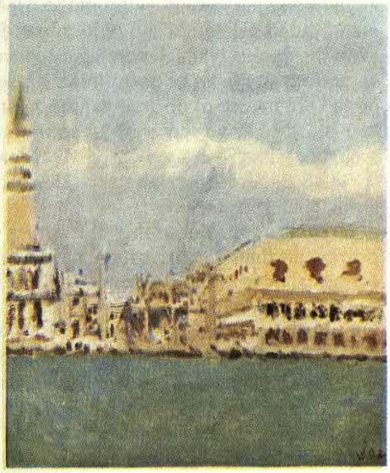


The Cleveland Museum of Art, Ohio, U.S.A.

The Wedding of St. George and Princess Sabra
by Dante Gabriel Rossetti

Tate Gallery, London

The Piazzetta and Doge's Palace, Venice
by Walter Sickert



Landscape
by Ben Nicholson

Thomas Gainsborough (1727-1788), a spontaneous and instinctive artist, was quite different from Wilson in temperament. He was interested mainly in landscapes, but he was also a fine portrait painter, and no other British artist has surpassed his skill in using colour. Like Gainsborough, John Crome (1768-1821), a weaver's son born in Norwich, Norfolk, was inspired mainly by the place where he lived.

The development of landscape in the 1700's was as remarkable in watercolour as in oil painting. Alexander Cozens (1717?-1786) and particularly his son John Robert Cozens (1752-1797) created a mature art of landscape in watercolour. The work of John Robert Cozens greatly influenced other landscape painters, including Thomas Girtin (1775-1802) and J. M. W. Turner.

During the 1700's, portrait painting became important again. It reached renewed perfection in the work of the two great rivals—Thomas Gainsborough and Sir Joshua Reynolds (1723-1792).

Gainsborough was superior to Reynolds both as a draughtsman and in his use of colour. He gave portraiture a spirit of informal and unself-conscious intimacy. Reynolds knew well the work of the great Italian painters of the Renaissance and of Rembrandt and Rubens. With his genius and scholarship, he gave maturity and splendour to the art of portraiture. His achievement affected the nature of portrait painting until the early 1800's. Other important portrait painters of this period included Allan Ramsay (1713-1784), George Romney (1734-1802), Sir Henry Raeburn (1756-1823), and John Opie (1761-1807).

Reynolds considered that portraiture was a less important art than "history painting," by which he meant historical or mythological paintings on universal themes. But British painters had never excelled at history painting on a large scale. Ironically, Reynolds's ideal of history painting was attained in the work of his fiercest critic, the writer and artist William Blake (1757-1827).

Blake's view of the world was entirely imaginative. His themes are universal, but expressed in a medium and on a scale that perfectly contains them. Blake lived and died in poverty. His achievement was not understood until his last years, when his work inspired Samuel Palmer (1805-1881) and a group of followers who called themselves *The Ancients.*

The early 1800's. The general trends that developed in painting in the 1700's continued until the mid-1800's. John Sell Cotman (1782-1842) and Richard Parkes Bonington (1802-1828) were fine landscape artists. Sir Thomas Lawrence (1769-1830) was a notable portrait painter. But two painters of this period were outstanding—John Constable (1776-1837) and J. M. W. Turner (1775-1851).

Constable, like John Crome, was inspired by the locality where he lived. He was a keen realist who considered that the subject was the most important element of a painting. But with his sense of form and colour he recreated on canvas equivalents of the things he saw in nature. The trees in his landscapes seem to be growing, and the clouds seem to move.

Turner had a long and complex painting career. In his youth, he made fine landscape drawings. In them he succeeded not only in recording a scene accurately, but also in expressing the interest of contemporary romanticism in anything picturesque. But Turner was also a classical painter with a wide knowledge of European art. He was a splendid designer and a superb and adventurous colourist. In his many landscapes and seascapes, he sombrely expressed the idea that human existence is fragile when contrasted with the tremendous powers of nature. But the pictures that he painted in Venice and at Petworth House in West Sussex also showed nature in its most peaceful mood. Later, Turner began to paint scenes that suggested an enchanted world of light and colour. He used colour to create shapes in pictures that are almost abstract at first sight. Many people consider him the greatest British painter.

In spite of the work of many fine artists, dull, insipid pictures gradually came to dominate British painting in the 1800's. Their subjects were mainly moralizing anecdotes of historical or literary topics, "scenes from familiar life," and shaggy Highland cattle. But the Royal Academy favoured this kind of art, and many painters of such pictures gained wealth and public honours.

The later 1800's. In 1848, the low artistic standards of much contemporary art prompted a group of painters to form the *Pre-Raphaelite Brotherhood.* They rejected old-fashioned traditionalism and tried to paint more spontaneously and realistically. They also replaced triviality and pomposity with an exalted, poetical feeling.

The artists of this movement differed entirely in character and in many of their aims. William Holman Hunt (1827-1910) was a forthright puritan. Dante Gabriel Rossetti (1828-1882) expressed his intense imagination and emotions in poetry, watercolours, and oil paintings. Sir John Millais (1829-1896), the most talented of the group, painted some magnificent pictures in the 1850's. But he later preferred to gain fame and wealth by painting pictures to suit popular taste. Ford Madox Brown (1821-1893), an important associate of the group, painted vigorous pictures of contemporary life. Sir Edward Burne-Jones (1833-1898) painted many romantic pictures on legendary themes, such as the stories of King Arthur.

The Pre-Raphaelites were soon followed by imitators—many of whom were uninspired. By the 1880's, their revolutionary movement had become as conservative as the trivial art they had tried to replace. Artists of both fashions disregarded the purely artistic aspects of painting and gave too much attention to the subject matter. Many people attacked this attitude and claimed that British painting needed to be revived.

The fresh ideas that revived British painting in the later 1800's came mostly from France. In 1886, painters who opposed the ideas of the Royal Academy formed the *New English Art Club.* Many of the members worked for some time in France, where they learnt much about French painting, particularly the work of Gustave Courbet and the leading impressionists (see **Impressionism**).

The British painters and the French impressionists had the same interest in bright colours, open-air subjects, and the poetry of everyday life. But they also differed in many ways. The British artists had a more traditional outlook. They also gave their subjects firmer treatment, because they rejected the French idea that a picture represented a brief glimpse at life from one spot and under the same effects of light. The most important members of the New English Art Club were Wilson Steer (1860-1942) and Walter Richard Sickert (1860-1942).

The 1900's. For 20 years, the New English Art Club made valuable contributions to the development of British painting. But eventually it began to form a rigidly orthodox outlook, and many artists gathered into several separate groups. The best known of these groups was the *Camden Town Group,* formed in 1911. The members of the Camden Town Group included several painters who were acquainted with French postimpressionism. But their own work remained sober and conservative.

British painters of the 1900's have been greatly influenced by painting in other countries, especially France. The French cubist painter Albert Gleizes greatly influenced the nonrepresentational work of the Irish painters Mainie Jellett (1897-1944) and Evie Hone (1894-1955). Before World War I (1914-1918), cubism and, to some extent, Italian futurism inspired some British artists to form a brief movement called *vorticism.*

The challenge of recording events and scenes of World War I inspired British artists to create some of the best work of the early 1900's. These fine war artists included Paul Nash (1889-1946).

British painters of the 1900's have tended gradually to abandon the naturalistic representation of objects. Many distinguished artists, notably Ben Nicholson (1894-1982), practised abstract painting. Some painters, such as Sir William Coldstream (1908-1987), continued to work in a more realistic style. Others painted in the surrealist style, because it gave them freedom to use many kinds of imagery in their works (see **Surrealism**). Artists such as Sir Matthew Smith (1879-1959) were notable for their use of brilliant colour. L. S. Lowry (1887-1976) painted pictures of the industrial suburbs of Manchester and Salford, in the north of England.

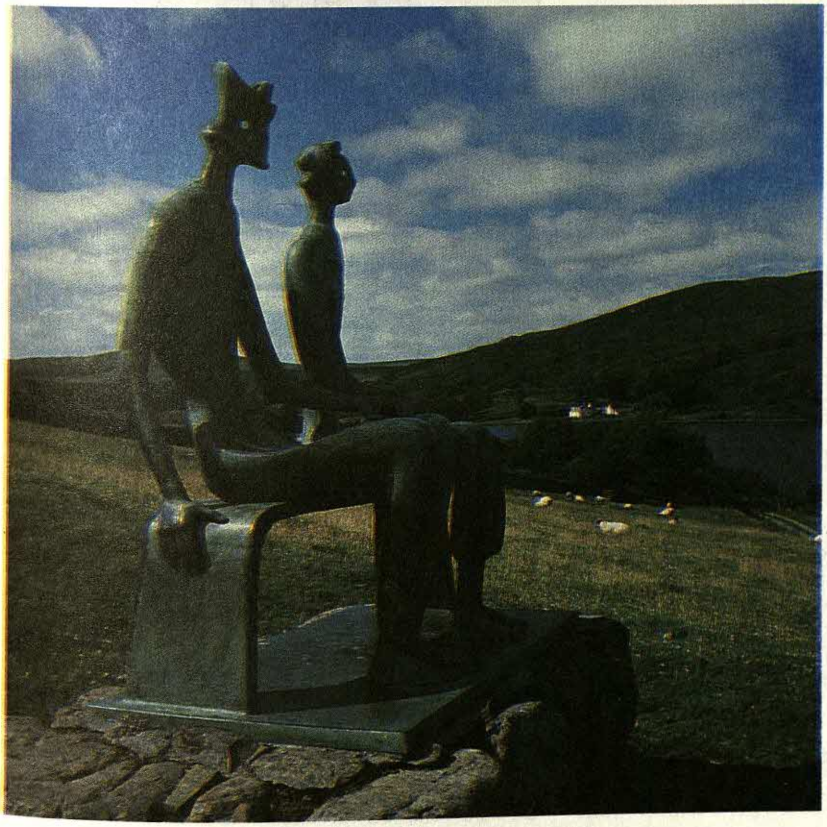
Just before World War II, the *Euston Road Group,* named after an art school in London, tried to revive traditional realism in British painting. The war interrupted their attempts. But, in the 1940's, one of the members, Victor Pasmore (1908-), painted many realistic masterpieces. Pasmore later turned to abstract painting. British interest in abstract painting grew from the 1950's, influenced by other European and American painters.

Other artists believed that imagery was important in painting. These painters, whose work differed in many other aspects, included Graham Sutherland (1903-1980), Ceri Richards (1903-1971), and Francis Bacon (1909-1992). A leading modern British painter and designer is David Hockney (1937-), who became prominent through his bold, unconventional pictures.

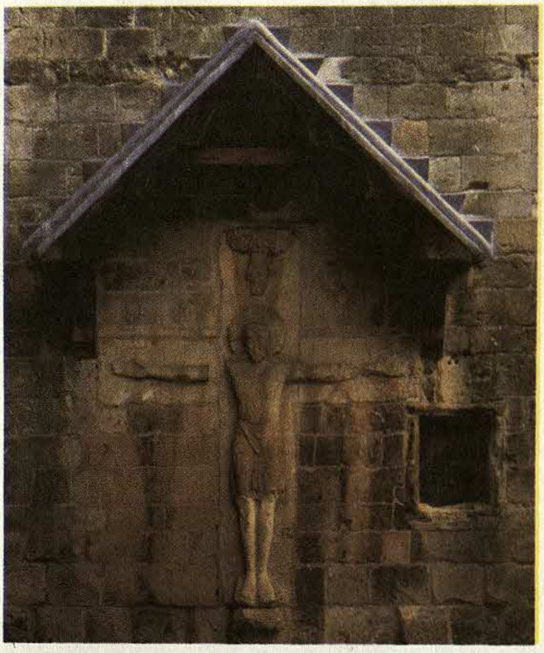
Sculpture

All the important art exhibitions, such as those held at the Royal Academy in London and at the Royal Scottish Academy in Edinburgh, include works of sculpture. Sometimes small shows of sculpture are staged in private commercial galleries. The public galleries in London and other large cities also buy sculptures for their permanent collections.

There is less demand for architectural sculpture in Britain than in such countries as Sweden. But, today, architects are tending to lay greater stress on sculpture.



Many of the works of English sculptor Henry Moore have a monumental quality and are designed to stand permanently in outdoor surroundings. This bronze sculpture, *King and Queen,* stands near Dumfries, in Scotland.



The Romsey Rood is a Saxon sculpture at Romsey Abbey in Hampshire. The hand of God appears above Christ's head.

With the encouragement of such bodies as the Arts Council, some large public and private organizations have commissioned works of sculpture.

Characteristics. Sculpture in the United Kingdom has a remarkably long history. Works of sculpture have survived from virtually every age, from the earliest times to the present day. It is true that sculpture has never been as important in Britain as it has been in some other European countries. There is, for example, little work of the *Romanesque* (Middle Ages) period that can compare with that of central France. In the style of the Renaissance there is nothing to equal the work in Italy of such sculptors as Donatello or Michelangelo. But there have been a number of periods when sculpture of great distinction was produced in the United Kingdom. At present, some of the world's outstanding sculptors are working in the United Kingdom. They use a variety of modern materials, including plastic, aluminium, and welded steel, as well as the traditional materials of stone and bronze.

History. *Early history.* Vigorous, though not always refined, work was done in England during the Roman occupation. Later, some *low relief* sculptures, mostly of animals, were done in Scotland (see **Relief**). In about A.D. 700, work of real quality was produced in Northumbria. Most of the sculpture was in *high relief* and represented figures and scenes from the Bible. Many of the reliefs were executed on tall crosses. The most famous crosses in the United Kingdom are those at Bewcastle in Cumbria, in northwest England; and at Ruthwell in Dumfries and Galloway Region, in southwest Scotland. See also **Celtic art**.

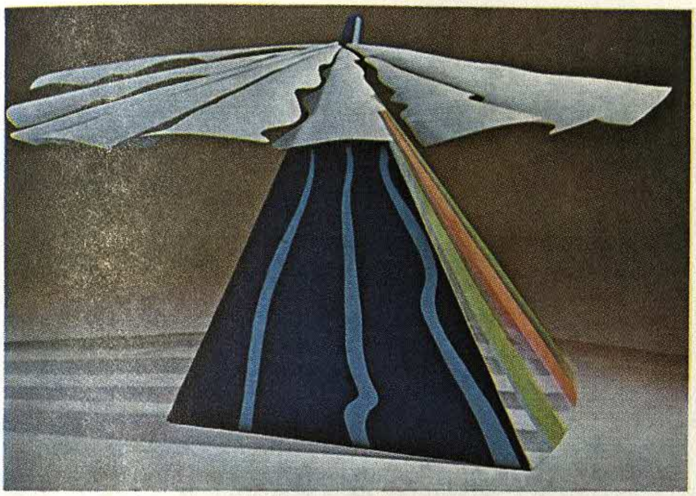
After a period of more abstract work, a new interest in naturalistic representation developed toward the end of the 900's. In this late Anglo-Saxon period, much work of great beauty was produced, both on a large scale in stone and on a small scale in bone and ivory.

After the Norman Conquest of 1066, formal patterns again became more popular than naturalistic representation. Some fairly good work was done under French influence in the 1100's, but it was not until the 1200's that great sculpture was again produced in Britain. Most of this sculpture was for churches and cathedrals. During this period, British sculptors produced work similar in quality to that in the cathedrals at Reims or Chartres in France. Superb examples of their skill in *figural* sculpture (sculpturing figures) may be seen at Westminster Abbey, in London; on the west front of Wells Cathedral, in Somerset; and, particularly, in the Angel Choir in Lincoln Cathedral, in Lincolnshire.

The 1600's and 1700's. The new style of the Renaissance in Italy was slow to influence British sculpture. The Puritan leaders of the Commonwealth period during the mid-1600's discouraged artistic activities of any kind. But, after the restoration of the monarchy, figural work once more became popular.

In the late 1600's and throughout the 1700's, many fine portrait figures and much good decorative work in churches and houses were done. Many sculptors from continental Europe worked in Britain. But one English sculptor stands out—the woodcarver Grinling Gibbons (1648-1720). Gibbons carved the stalls for St. Paul's Cathedral, in London.

A statue of John Donne, the English poet, stands in St. Paul's Cathedral, London. It was made by Nicholas Stone in 1631.



Twilight, *above left,* is a plastic sculpture by Philip King. It is an example of the use of new materials by sculptors in the 1960's. Barbara Hepworth sculpted *Winged Figure, above right.* It is a huge aluminium work adorning the side of a department store in London.

The 1800's. Apart from some figures intended to stand as statues in public places, British sculptors in the 1800's produced works intended mainly for tombs, or as part of the adornment of churches or great country houses. But, during the 1900's, sculptures have increasingly been produced specially for exhibition in galleries or in public places.

The Italian sculptor Antonio Canova (1757-1822) largely set the fashion for the sculptors of the 1800's in Britain. Canova sculpted exact, elegant figures with highly polished marble surfaces. The work of this period is generally described as *Academic,* because it tended to follow ancient Roman classical conventions. This style has now gone out of favour with most modern sculptors, although examples of Canova's work remain highly valued.

The 1900's. Many sculptors rejected the Academic style in the early 1900's. At first sculpture remained figural. But sculptors came to regard the expression of feeling as more important than exact representation of forms and features. The greatest exponent of the new style was Sir Jacob Epstein (1880-1959).

But, later, many sculptors rejected naturalistic forms and produced *abstract* works. Two of the most famous British abstract sculptors of the mid-1900's are Henry Moore and Barbara Hepworth. Moore's work is famous throughout the world. The great group in front of the UNESCO building in Paris is one of his best-known works. Moore and Hepworth often created sculptures for specific landscape settings. During the late 1900's, prominent British sculptors included Philip King, Anthony Caro, and Elisabeth Frink.

Music

One of the most popular features of British musical life is the orchestral concert. But choral music also flourishes, as does opera.

In London are the Royal Festival Hall, one of the world's great concert halls, and the Royal Albert Hall, which can hold 6,000 people. The Henry Wood Promenade Concerts, founded in 1896, are held there every summer. They are often called *the Proms.* The programmes cover a wide field of orchestral, choral, and operatic music. Smaller halls include the Wigmore Hall, famous for its chamber recitals, and St. John's, Smith Square, a converted church. Most other cities and large towns in Britain have at least one hall used for concerts.

Arts festivals also provide opportunities for hearing music. The Edinburgh Festival, founded in 1947, is the most famous British arts festival. Music in its programme includes operas, orchestral concerts, chamber music, and ballets. The festival lasts for three weeks each year. In Gloucestershire, the Cheltenham Festival, founded in 1945, specializes in music by contemporary British composers. The Aldeburgh Festival in Suffolk, the Bath Festival in Avon, and several other music festivals take place during the year.

The performance of music. ***Orchestras.*** Britain has 11 principal professional symphony orchestras and several smaller orchestras. Five of the principal orchestras have their headquarters in London, and the rest have theirs in Belfast, Birmingham, Bournemouth, Glasgow, Liverpool, and Manchester. The most famous outside London include the Hallé Orchestra of Manchester, which was founded in 1858, and the City of Birmingham Symphony Orchestra.

The oldest London orchestra is the London Symphony Orchestra (1904). Two orchestras founded by the conductor Sir Thomas Beecham are the London Philharmonic Orchestra (1932) and the Royal Philharmonic Orchestra (1946). The Philharmonia Orchestra, formed in 1945, contributes richly to London's musical life. The BBC Symphony Orchestra (1930) broadcasts regularly, and also gives concerts in London. The Royal Philharmonic Society (1813) has no orchestra of its own, but engages London orchestras in turn for its concerts.

Choirs. There are two major choral festivals. The Three Choirs Festival, held every year since 1724, is held in Gloucester, Hereford, and Worcester in turn. The Leeds Triennial Festival, held almost every third year

The last night of the Proms has become a festive occasion for both promenaders and the members of the BBC Symphony Orchestra. They share in performing such works as "Jerusalem."

since 1858, now includes orchestral works and usually introduces new music. Well-known British choirs include those of Kings and St. John's Colleges, Cambridge, and Magdalen College, Oxford. Many choirs make regular broadcasts and recordings. London has a large number of professional and amateur choirs. *Male voice* choirs are particularly popular in Wales.

History. One of the earliest compositions of importance in the history of British music is "Sumer Is Icumen In." This *round* (a partsong in which voices follow each other at equal intervals) was almost certainly composed in the early 1200's, probably by a monk, John of Fornsete. John Dunstable, 200 years later, won fame on the mainland of Europe as well as in England. During the next hundred years, John Taverner, Thomas Tallis, and Christopher Tye founded a fine school of Tudor church music and established a tradition of choral music.

One of the early British composers best known today was William Byrd, who lived from the mid-1500's to the early 1600's. He was the greatest church composer of the Elizabethan Age. During this period, instrumental and secular vocal music became more firmly established. Byrd composed many works of this kind in addition to his church music. At the same time, John Dowland won international admiration for his music for lute and voice. Thomas Morley, Thomas Weelkes, John Wilbye, and Orlando Gibbons were great writers of madrigals, and John Bull was supreme as a keyboard composer.

A form of entertainment called the *masque* evolved in the 1600's and led to the development of opera in Britain. The earliest surviving British opera is *Psyche* (1673), by Matthew Locke. But Henry Purcell was the finest British musician of the late 1600's. His most famous masterpiece, *Dido and Aeneas,* is an opera written for a girls' school. He excelled equally in writing other kinds of music. His early death, at the age of 36, is one of the tragedies of musical history. While Purcell was still a youth, musicians gave the first public concerts in England. This innovation signified great changes in the social role of music. Far more people were able to listen to fine music performances.

No British composer achieved greatness for more than 200 years after Purcell's death. The German composer George Frideric Handel settled in London in 1712 and dominated English music with his operas and oratorios.

In 1728, John Gay wrote *The Beggar's Opera,* establishing a new kind of light entertainment, called *ballad opera.* Thomas Arne was an accomplished writer of theatre music. His song "Rule Britannia" is from a theatrical masque.

A notable composer of the early 1800's was an Irishman named John Field. His piano music significantly influenced the Polish composer Frédéric Chopin. Field eventually settled in Russia. Later in the 1800's, Sir Arthur Sullivan, together with his *librettist* (writer of the words) Sir William S. Gilbert, wrote a large number of sparkling operettas.

Composers born later in the 1800's also helped develop British music. The oratorio *The Dream of Gerontius,* by Sir Edward Elgar, became the first work of genius in a serious vein by a British composer since Purcell's time. Elgar's contemporary Frederick Delius evolved a personal lyrical style of music. A little later, Ralph Vaughan Williams forged a new English national style from his study of British folk song and Tudor church music.

Among composers born after 1900, Sir William Walton, Sir Michael Tippett, and Benjamin Britten became well known internationally. Britten's opera *Peter Grimes* (1945) did much to revive opera in Britain. The freshness of style that characterizes his vocal music helped revive interest in choral singing. Several of Britten's works, including operas, are specially written for young performers.

The work of a new generation of composers became a force after 1945. These composers include Alexander Goehr, Peter Maxwell Davies, Richard Rodney Bennett, and Harrison Birtwistle. The musical techniques of the great Austrian composer Arnold Schoenberg influenced most of these composers.

Opera

Opera in Britain is enjoyed through radio and television broadcasts, live performances, and recordings. The major theatres for opera are in London. Audiences in other British cities see relatively few professional opera performances. An exception is Leeds, in West Yorkshire, where Opera North stages a full season of productions. Scotland, Wales, and Northern Ireland each have resident opera companies. There are also many amateur opera groups.

Opera companies. The two main professional opera companies in London are the Royal Opera and the English National Opera.

The company of the Royal Opera House, Covent Garden, was founded just after World War II by the Covent Garden Trust. Most operas given there are performed in the original language. Since the 1950's, Covent Garden has won international acclaim and has presented opera stars from all parts of the world. Famous British singers who have performed there include Sir Geraint Evans and Jon Vickers. British conductors associated with Covent Garden include Sir Colin Davis.

English National Opera is a permanent company based at the London Coliseum. It sings all its opera in English. It was based originally at Sadler's Wells and adopted its present name in 1974. The New Sadler's Wells Opera first performed in 1983.

Outside London, many towns and cities stage opera performances for at least two weeks out of every year. The English National Opera has a touring company whose work is supplemented by Opera North. Kent Opera tours with its productions. The Welsh and Scottish companies also stage tours.

Opera for All, which exists to bring opera to the more remote communities, is an organization supported by the Arts Council.

Glyndebourne, in East Sussex, has an annual summer opera festival of international fame.

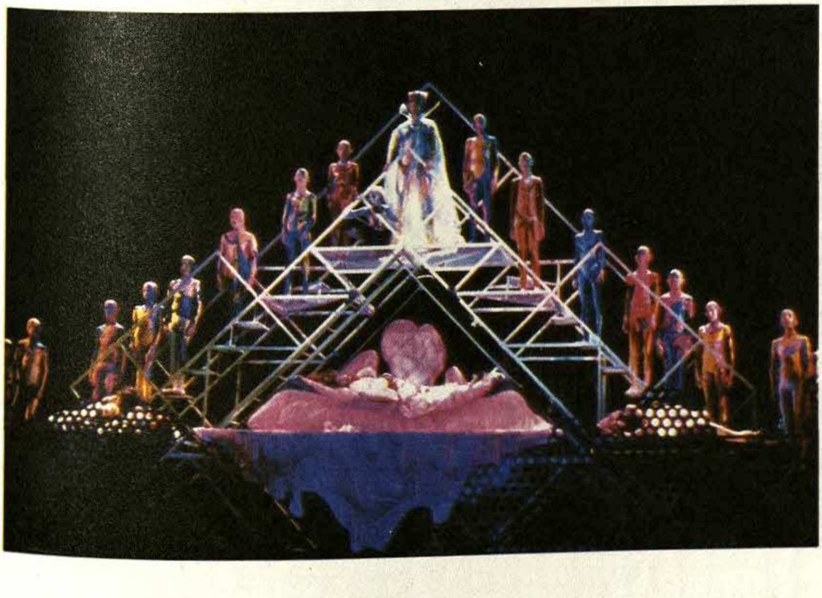
Scottish Opera was set up in 1962. It took up its permanent home at the Theatre Royal, Glasgow, in 1975. Scottish Opera also tours throughout the United Kingdom and abroad.

Welsh National Opera was formed in 1946. It puts on productions in Cardiff and also gives performances in Birmingham, Bristol, Llandudno, and Swansea, and tours throughout the United Kingdom.

History. In 1689, Britain's first great opera, *Dido and Aeneas* by the English composer Henry Purcell, was staged. The German-born composer George Frideric Handel dominated English opera during the 1700's. In the late 1800's, Gilbert and Sullivan's comic operas won fame. In the 1900's, Michael Tippett and Benjamin Britten became Britain's leading composers of opera.

Ballet

Ballet companies. Britain's major ballet companies include two companies of the Royal Ballet (founded in 1930), one at the Royal Opera House, London, and the Birmingham Royal Ballet (formerly Sadler's Wells); the



Midsummer Night's Dream, **an opera by Benjamin Britten, produced by the Royal Opera House, Covent Garden, in London.**

Rambert Dance Company (1926); the English National Ballet, formerly the London Festival Ballet (1950); and the Scottish Ballet (1957). In Northern Ireland, the major company is the Patricia Mulholland Irish Ballet (1951).

The Royal Ballet is recognized by most people as the United Kingdom's national ballet company. In 1930, when the company was founded by Ninette de Valois, it was called the Vic-Wells Ballet. The company first became known as the Royal Ballet in 1957. The Royal Ballet bases its repertoire on the great classical and romantic ballets. It has developed a British style of dancing, seen best in choreographer Sir Frederick Ashton's *La Fille Mal Gardée, Ondine,* and *Symphonic Variations.*

Well-known choreographers working in British ballet have included John Cranko and Sir Kenneth MacMillan. Both men displayed great invention in their arrangement of classical steps and in their use of jazz and folk-dance steps in combination with classical steps.

The Rambert Dance Company was originally a classical ballet company. From 1935 to 1987, it was known as Ballet Rambert. The Rambert Dance Company concentrates on new works. Dame Marie Rambert, founder of the company, trained many British choreographers.

The Royal Ballet and the Rambert Dance Company have trained many fine dancers as well as choreographers. The faultless dancing of Margot Fonteyn still serves as a model to young dancers. The Russian-trained Alicia Markova developed into the first British ballerina of international renown. Sir Anton Dolin's technical brilliance in the solo dance and the *pas de deux* (dance for two people) set a standard for male dancers. John Gilpin, who eventually became artistic director of the London Festival Ballet, now the English National Ballet, was known for the grace, simplicity, and musicality of his dancing.

The English National Ballet is a large company founded by Markova, Dolin, and Julian Braunsweg. It has a repertoire of classics ranging from *Giselle* to the most successful ballets by Michel Fokine. But it has developed few new ballets. The Scottish Ballet is devoted to performing experimental works and creating new ballets. The Patricia Mulholland Irish Ballet of Belfast performs ballet based on folk dances.

History. Ballet was popular in Britain in the form of the *masque* (a kind of courtly entertainment) in the 1500's. An English choreographer, John Weaver, developed the ideas of the masque in *The Loves of Mars and Venus* (1717). This was the first known *ballet d'action.* It told its story using only dance and gesture. Choreographers on the mainland of Europe developed the ballet as it is today.

The popularity of ballet increased greatly in the UK during the 1900's. Much of this enthusiasm was inspired by performances in the UK of Russian ballet, under the direction of Sergei Diaghilev, from 1911 to 1929.

The achievements of British ballet rest on the combined work of choreographers and ballet teachers. The Rambert School and the Royal Ballet School have improved ballet standards greatly. Leading dancers have included Lesley Collier, Anthony Dowell, Merle Park, Antoinette Sibley, and Wayne Sleep.

Theatre

Theatre is a popular form of entertainment for many people in the United Kingdom. Parties often organize theatre outings to see plays, opera, or ballet. Schools put on plays and groups of children see plays as part of their educational course. Some cities and towns have their own professional repertory companies. Many people belong to amateur dramatic societies.

The United Kingdom is one of the world's major centres for theatre. Visitors come from all parts of the world to see British theatre productions.

The Edinburgh Festival, in Scotland, is a major international venue for new playwrights to present their work. Another drama festival takes place in Chichester, West Sussex.

Theatre companies. In the early 1990's, there were about 50 theatres in the central London district known as the *West End.* Most of the theatres have no fixed company of actors and actresses. Most stage one show—a play or musical—until its popularity wanes.

The Royal National Theatre, founded in 1962, operates a repertory system, with a regular company of performers. At its three stages on London's South Bank, it presents plays from different countries and periods.

The Royal Shakespeare Company which is based at Stratford-upon-Avon, Warwickshire, also performs at the Barbican Theatre in London. It produces a mainly Shakespearian programme.

The Royal Ballet performs a wide variety of ballets, including some modern ballets such as *Elite Syncopations, left.*

Royal National Theatre actors perform in a production of *Rough Crossing,* a play by Tom Stoppard.

The English Stage Company at the Royal Court Theatre in London performs the works of the most talented new playwrights.

Regional theatres often stage plays that have been successful in London. But they also put on new works. Notable regional theatres include the Bristol Old Vic; the Festival Theatre, Chichester; the Royal Lyceum, Edinburgh; the Playhouse, Nottingham; the Theatre Royal, Plymouth; and the Crucible Theatre, Sheffield.

Northern Ireland's leading theatres include the Lyric Theatre, Stranmillis, Belfast; the Belfast Arts Theatre; and the Riverside Theatre, the theatre of the New University of Ulster at Coleraine.

History. Britain's commercial theatre began in the 1500's, during the reign of Elizabeth I. This era, known as the Elizabethan Age, was famous for its great playwrights such as Marlowe and Shakespeare. See **English literature** [Elizabethan drama]. Among the first commercial theatres built in Britain were the Blackfriars and the Globe in London. The Elizabethan theatre stage jutted out into the auditorium and had no curtain. It was called an *apron stage.* The ground area around it had no covering, but the upper galleries encircling the stage did.

From 1642 to 1660, all theatres in England closed because the Puritans believed that watching plays made people idle and lazy. After the restoration of the monarchy in 1660, the theatres reopened. This period became known as the *Restoration Theatre.*

The theatre continued to flourish during the 1700's. Leading playwrights of this period include Farquhar, Goldsmith, and Sheridan. Actors included Edmund Kean, David Garrick, and Mrs. Siddons.

During the 1800's, few British plays were written. Most theatres presented translations of plays from other countries. But, by the end of the 1800's, the British theatre regained its own national identity with playwrights such as Sir Arthur Pinero and Oscar Wilde. Music hall originated at this time as a form of entertainment in public houses. See **Music hall.** The performers sang, told stories, or danced. Another popular form of the theatre during this period was pantomime. See **Pantomime.**

In the early 1900's, musicals, witty revues, and the plays of Noel Coward were popular with theatre audiences in London. From the mid-1950's, there were more plays dealing with social problems, which aimed at stimulating argument as well as entertaining. Playwrights such as John Osborne, Arnold Wesker, John Arden, Robert Bolt, Harold Pinter, Tom Stoppard, and Alan Ayckbourn aroused fresh interest in the theatre.

Related articles. See **Ballet; Classical music; Dancing; Drama; Music; Opera; Painting; Sculpture; Theatre;** and their lists of related articles. See also the *Arts* section of the articles **England; Scotland; Wales.**

Outline

I. Arts councils
- A. The Arts Council of Great Britain
- B. The Arts Council of Northern Ireland

II. Painting
- A. Characteristics
- B. History

III. Sculpture
- A. Characteristics
- B. History

IV. Music
- A. The performance of music
- B. History

V. Opera
- A. Opera companies
- B. History

VI. Ballet
- A. Ballet companies
- B. History

VII. Theatre
- A. Theatre companies
- B. History

Questions

What was the most common form of painting during the Tudor and Stuart periods?
Why did the Puritans close all English theatres in the 1600's?
What were the aims of the *pre-Raphaelite brotherhood?*
Which form of entertainment in the 1600's led to the development of opera in Britain?
Who is widely considered to be the greatest British painter?
What innovations did the choreographers John Cranko and Sir Kenneth MacMillan introduce to British ballet?
What role is played by the arts councils in the UK?
How has UK theatre changed since the mid-1950's?
What qualities contributed to William Hogarth's reputation as an outstanding and original artist?
Who composed the oratorio *The Dream of Gerontius?*

Education may start at nursery school. This nursery child is learning to express himself in painting.

Graduation marks the end of education for university students, who wear traditional gowns for the ceremony.

Educational systems of the United Kingdom

United Kingdom, Educational systems of the. The four lands that make up the United Kingdom (England, Northern Ireland, Scotland, and Wales) have different histories and distinctive cultures. The UK educational systems are similar in general structure, but cultural differences have influenced their organization, as well as attitudes, standards, and values.

Education is divided into three stages—primary education, secondary education, and further and higher education. Full-time education is compulsory between the ages of 5 (earlier than in many other countries) and 16. A very high proportion of young people continue in full-time education, or part-time education and training, until the age of 18. Education during the primary and secondary stages is general rather than vocational.

Characteristics

In spite of many differences, the four state educational systems in the UK have the following general characteristics in common:

(1) State education is provided and controlled by central government and local authorities, working in partnership. This system is unlike that in France, for example, where the central government exercises dominant control. It is also different from the United States, where central government has little control.

(2) Public authorities and voluntary organizations, working together as partners, provide education. In some other countries, these organizations compete with each other.

(3) State education is freely available to all, regardless of sex, colour, social class, religion, or politics.

(4) Education is planned to give children equal but varied opportunities.

(5) Responsibility for school organization and teaching methods is exercised mainly by teachers, rather than by school inspectors or by other government agents.

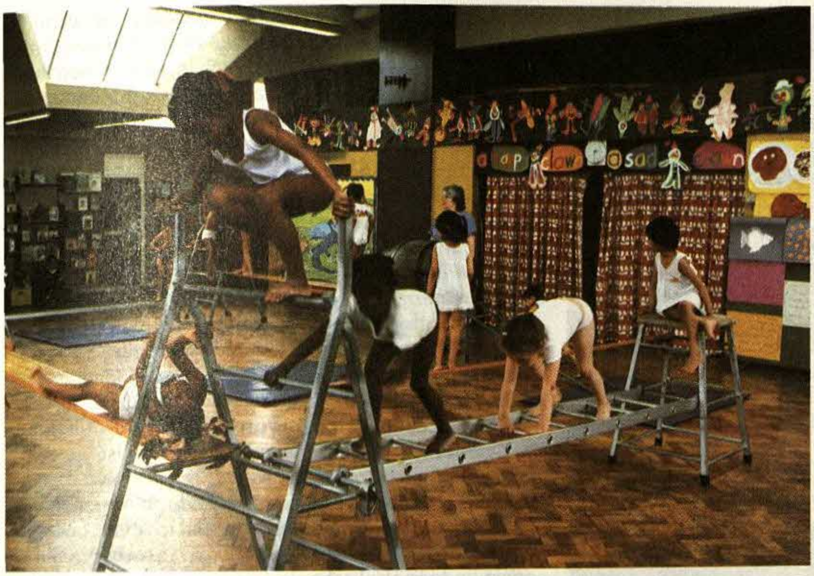
(6) Many agencies such as public libraries, museums, art galleries, and the educational liaison staff of large companies cooperate with the schools. The British Broadcasting Corporation (BBC) provides regular radio and television services and the Independent Broadcasting Authority (IBA) provides television lessons.

In proportion to its population, the UK educates a large number of overseas students.

Schools

Organization and administration. *England and Wales.* England and Wales have about 21,000 primary schools and about 4,200 secondary schools. Most primary and secondary schools are *maintained schools.* They are supervised and supported financially by local education authorities (LEA's)—usually local county councils, except in the metropolitan counties, where the district council is the LEA. In London, each of the London boroughs is an LEA. The LEA's put into effect policies of the Department of Education and Science and of the Welsh Education Department. Teachers in maintained schools must not give religious instruction connected with a particular denomination, but must, by law, provide Christian instruction, although individual parents may withdraw their children from it.

The 1988 Education Reform Act offered all schools the possibility of *opting out* of local authority control and of receiving direct funding from the government. A proposal to opt out could be made only after a ballot of parents. These grant-maintained schools obtained greater control over their own expenditure, under schemes for local management of schools (LMS). No fees are charged, but entry is often selective.



Physical education gives primary schoolchildren an opportunity to develop self-confidence as well as physical strength.

Voluntary schools are overseen by LEA's, but are partly maintained by churches or other voluntary organizations. They can give their own form of religious instruction. In Wales, many schools teach in Welsh or are bilingual.

Independent schools are commonly referred to as *private* or sometimes as *public* schools. They receive no financial aid and are independent of LEA's, although some children attend them at their LEA's expense. Many independent schools are academically selective, charge high fees, and are socially prestigious. About 6 per cent of children of secondary school age attend independent schools. Government inspectors inspect such schools before they are registered, to ensure that basic health, safety, and teaching standards are met.

Beginning in the autumn of 1989, a *National Curriculum* was introduced into all state-funded schools in England and Wales. The National Curriculum sets out to ensure that all children aged from 5 to 16 study essential subjects and learn certain basic skills.

The National Curriculum comprises 10 *foundation subjects,* including three *core subjects.* The core subjects are English, mathematics, and science. The other foundation subjects are technology (including design), history, geography, music, art, physical education, and, for pupils aged 11 to 16 years of age, a modern foreign language. In Wales, the Welsh language is a fourth core subject in Welsh-speaking schools, and a foundation subject in other schools. Religious education is provided for all pupils as part of the basic curriculum, but parents can choose to withdraw their children from classes in religion.

The curriculum sets targets for what pupils nationwide should know, understand, and be able to do at the ages of 7, 11, 14, and 16. Children are tested at each of these ages so that they can be measured against national standards.

Scotland. The classification of Scottish schools and the arrangements made for religious instruction differ from the system in England and Wales. Each regional or island authority council acts as the LEA. As in England and Wales, most primary and secondary schools are maintained schools. Scotland has about 2,500 primary schools and about 400 secondary schools.

LEA's oversee *public* and *church schools.* In Scotland, the term *public school* describes a primary or secondary school. Scottish church schools are fully provided for and maintained by LEA's. The LEA's must provide a denominational school at their expense if demand for it exists.

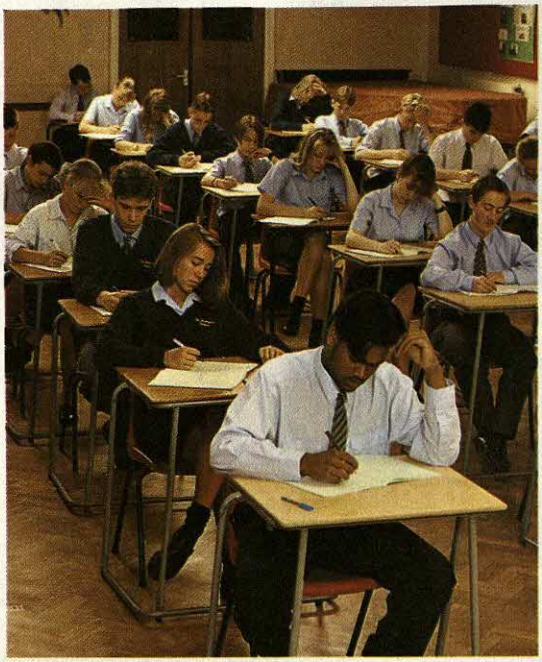
Northern Ireland. The school system of Northern Ireland is very similar in organization to that of England and Wales. It differs, however, in that the voluntary school sector is so much larger. Almost half of the 1,000 primary schools are Roman Catholic. About half of the 200 secondary schools are only partly under the control of the local area education and library boards. In Northern Ireland secondary education is still selective, though the eleven plus examination is being replaced as a means of selection by National Curriculum assessments. Schools not run by the Roman Catholic Church are composed almost exclusively of Protestant teachers and pupils.

Each educational system in the UK includes a school health service and a meals service. Local careers offices advise school-leavers about careers, help them to find jobs, and give them guidance until the age of 18.

Nursery schools. In each educational system, some provision is made for children below compulsory school age to attend classes. *Nursery schools* take children from the age of 2. *Nursery classes* in some primary schools have children from the age of 3.

Primary schools. Most children in the UK begin their school education at the age of 5. At first they take part in play activities. Later, they start to learn definite skills, especially in reading, writing, and arithmetic.

Some English LEA's retain the traditional *infant school* for 5 to 7 year-olds, and *junior schools* for 7 to 11 year-olds. Others followed the recommendation of the Plowden Report (1967) and established *first schools* for 5 to 8 year-olds and *middle schools* for pupils between 9 and 12 or 13 years.



Pupils' ability is tested by examination, *above,* and by the quality of their coursework during previous years.

In Northern Ireland and Wales, children generally remain in a junior school until about the age of 11. In Scotland, they stay until they are about 12.

Secondary schools. The majority of secondary schools are coeducational. They are organized differently in the four educational systems.

In England and Wales, most children transfer to a *comprehensive secondary school* which caters for all levels of ability. Comprehensive schools vary in their organization and size. Some cater for the full age range, 11 to 18. Under many LEA's, schools have an age range of 11 or 12 to 16, pupils over the age of 16 attend a *sixth form college.* Comprehensive schools may have as many as 2,000 pupils.

At the end of the 1980's, the *City Technology College* (CTC), was introduced. CTC's have a strong science and technology bias, and take pupils from 11 to 18. Unlike comprehensive schools, they are jointly funded by government and business. No fees are charged.

At the age of about 16, pupils take an examination for the *General Certificate of Secondary Education (GCSE).* The grade that students receive depends partly on the quality of coursework they do during the two years leading up to the examination. The first GCSE examinations were held in 1988, replacing the General Certificate of Education at *O* level, and the Certificate of Secondary Education. Most pupils who stay at school beyond the age of 16 begin to prepare for the General Certificate of Education examination at *Advanced level* (*A* level).

Some pupils aged 16 who wish to continue in school or further education college to prepare for a commercial career may undertake a pre-vocational course. The course lasts a year and contains some work experience. It leads to a *Certificate of Pre-Vocational Education.*

In Scotland, almost all secondary schools are comprehensive in character. Most take children between the ages of 12 and 18. But some take children between the ages of 12 and 16 and then transfer them to schools that have facilities for advanced work. Senior secondary pupils study for the *Scottish Certificate of Education.* Scottish pupils aged 16 may take examinations at *Standard grade* (*S* grade). They may then go on to take *Higher grade* (*H* grade) examinations at the age of about 17. Some pupils study in greater depth and go on to take the *Certificate of Sixth Year Studies.*

In Northern Ireland, most pupils from 12 to 18 attend comprehensive schools. But some children, selected through tests, go to grammar schools. Pupils study for the *Northern Ireland General Certificate of Secondary Education,* an examination first held in 1988.

All UK secondary schools provide physical education and games. Out of school hours, they may also provide voluntary *extracurricular* activities.

Special schools. In the four UK educational systems, handicapped children receive special treatment. Many handicapped youngsters attend ordinary schools. But some go to special schools, either as daytime pupils or as boarders. Handicapped children are grouped for education into the following categories: blind; partially sighted; deaf; partially hearing; educationally subnormal (ESN); epileptic; physically handicapped; *aphasic* (having speech defects); delicate; and maladjusted.

Further education

Further education (FE) refers to every kind of educational activity for people over the school-leaving age. However, the term *higher education* is generally used to refer to courses for which the minimum entry requirement is normally two passes in the GCE examination at Advanced level. Further education includes vocational education, general education, and social and recreational activities.

Vocational education. A high proportion of further education (provided in technical colleges, colleges of art, or agricultural colleges and institutes) is vocational in character. About half of the students in FE follow vocational courses, more than a quarter take non-examined courses, and the rest study for GCSE or A level examinations.

Sixth form colleges offer alternative courses for 16 to 19 year-old students who do not wish to follow A level courses. In 1986, the National Council for Vocational Qualifications (NCVQ) was established to reform and rationalize existing vocational qualifications. There are five levels of NVQ. Level 2 equates with 4 GCSE's and level 5 with a post-graduate award. The task of setting standards has been entrusted to organizations such as the Royal Society of Arts, City and Guilds of London, and the Business and Technology Council. In 1992, these bodies introduced a General National Vocational Qualification (GNVQ) as an alternative route through the sixth form of a FE college. The full GNVQ level 3 is the equivalent of A level.

The Business and Technology Education Council (BTEC), set up in 1974, offers First National and Higher National Certificates or Diplomas and are equivalent to GCSE, A level, and degree equivalents. Courses may be full- or part-time.

Courses of study. Courses are arranged in academic years beginning in September or October and ending in the following June or July. Students must generally begin a course at the start of the academic year. Some further education courses are full time. For example, one-year or two-year courses for farm workers at *farm institutes* are generally full time. Advanced art courses are also full time. But most further education is provided in part-time courses. These courses are of three general types—sandwich, day release, and block release.

A *sandwich* course generally involves a period of six months' study at a technical college alternating with a period of six months at work. Other sandwich schemes alternate one year in a technical college with one year at work. A *thick sandwich* course starts with one year at work, followed by three years at college, and a final year at work.

A *day-release* course generally involves one day and one or two evenings a week attending a course at a technical college. Day-release courses are the most common form of part-time study.

An employee taking a *block-release* course spends 1 whole week in 5, or 2 weeks in 10, at a further education college. A student on block release can do more intensive study than in a day-release arrangement.

Other types of further education. People take courses in general education, called *adult education*, for its own sake. They may take no examinations, and gain no qualifications. Local education authorities provide such education in colleges of further education. The Workers' Educational Association and the extramural departments of universities also work together to provide adult education. Local education authorities and voluntary organizations provide social and recreational activities. Men and women in the UK armed services may receive vocational and general education in colleges provided by local education authorities.

Administration. Recreational further education in the UK is administered by LEA's. In addition, there are the national colleges, conducted and financed jointly by the Department of Education and Science and the appropriate industries; a few independent residential colleges; and the Scottish central institutions (the equivalents of colleges of higher education in England and Wales), run by the Scottish Education Department. On April 1, 1993, FE and sixth form colleges in England and Wales were removed from local authority control and became independent corporations under their own governing bodies. They offer vocational and academic courses. The Further Education Funding Council was set up to administer their funding.

Higher education

Polytechnics. In the mid-1960's, 30 of the largest non-university colleges of technology and further education were designated *polytechnics.* The government set up the Council for National Academic Awards (CNAA), through which these polytechnics and other higher education colleges (mainly developed from former teacher training colleges) might offer degree-level courses and opportunities for postgraduate study and research. By the end of the 1980's, they enrolled as many degree-level students as the universities. Until the Education Act of 1988, the polytechnics were maintained by local education authorities. Under that act, they achieved self-governing status, receiving state funds through the Polytechnics and Colleges Funding Council (PCFC).

In 1992, the Further and Higher Education Act abolished the distinction between polytechnics and universities. Polytechnics could apply to award their own degrees and to adopt a university name. For example, Newcastle Polytechnic changed its name to the University of Northumbria at Newcastle.

From September 1992, all existing polytechnics and several of the former Scottish central institutions, were allowed to award their own degrees for taught courses and for research. Certain colleges of higher education were also allowed to award their own degrees for taught courses. On April 1, 1993, the PCFC was replaced by the Higher Education Funding Council in England and Wales, and the Scottish Higher Education Funding Council in Scotland. The CNAA was abolished at the end of March 1993, and its functions taken over by various academic bodies.

Woodwork and other practical skills can be learned by using spare time to take further education courses.

Universities. Although mainly supported by public funds, UK universities are not part of the public system of education. There are now nearly 100 universities in the United Kingdom. They include some of the oldest and most famous in the world. All these universities are open to anyone with the necessary academic qualifications. The Open University does not require formal academic qualifications.

Each university in the UK has a *charter*—a document that makes it a legal corporation and gives it the right to grant degrees. After the 1800's, the monarch granted these charters. The pope granted some of the earlier charters.

All universities in the UK perform the same functions of teaching, research, and public service. But they vary greatly in their buildings, organization, and the courses of study they offer. The universities founded in the 1800's and 1900's are known as *redbrick* universities to distinguish them from the stone-built universities.

Oxford and Cambridge are the oldest UK universities. Oxford was founded in the mid-1100's, during a period of great intellectual activity throughout Europe. Cambridge was founded at the beginning of the 1200's. In time, wealthy and pious people founded colleges to accommodate poor scholars. As a result, Oxford and Cambridge universities today are clusters of colleges. Every student is a member of a college.

Oxford and Cambridge developed a pattern of teaching by *tutorials* (discussions between a student and teacher). The traditional curricula consisted of the humanities and mathematics. These subjects still have great prestige, and attract many students. Today, the curricula also include the natural and social sciences.

A person wishing to enter one of these universities faces intense competition. A large proportion of the students are from senior independent schools, partly because of the long associations that the universities have with these schools. Many people consider that possessing a degree from Oxford or Cambridge is an advantage for occupations in business or government.

Ancient Scottish universities are the universities of Aberdeen, Edinburgh, Glasgow, and St. Andrews. The oldest is St. Andrews, founded in 1410.

Durham University was founded in the 1800's, but it has many of the features of the older universities. Church authorities founded the university, which was given the use of Durham Castle. The university today consists of 13 colleges, with residential accommodation.

Federal universities include the University of London and the University of Wales. Each consists of a number of separate and largely self-governing institutions linked through a central administration. The University of London, with more than 40,000 full-time students, is the largest. It includes a number of general and specialist colleges, many as large as whole universities elsewhere, such as University College London, King's College, the London School of Economics, and the Institute of Education; a number of world famous medical schools; and specialist institutes mainly for postgraduate study.

The University of Wales comprises six colleges—Aberystwyth, Bangor, Cardiff, Swansea, St. David's College (Lampeter), and the Welsh National School of Medicine.

The early civic universities, sometimes called the *modern* universities, include the universities of Belfast, Birmingham, Bristol, Leeds, Liverpool, Manchester, and Sheffield. These universities were established in the late 1800's to provide university education for people living nearby. Some were founded by individual benefactors, others by the community as a whole. These universities represented the first clear break with the pattern of education established by Oxford and Cambridge.

The later civic universities were founded at the end of the 1800's and the beginning of the 1900's. They include the universities of Exeter, Hull, Leicester, Nottingham, Reading, and Southampton. At first, they prepared students for the external degrees of the University of London. Reading gained its charter in 1926. The others received their charters between 1948 and 1957.

New universities, founded in the 1960's, include the universities of East Anglia, Essex, Kent, Lancaster, Stir-

Many modern universities were founded in the United Kingdom in the 1800's and 1900's. Students may study a less traditional variety of courses.

St. Andrews University is the oldest university in Scotland. Its charter dates from 1410.

ling, Strathclyde, Sussex, Warwick, and York. The University of Keele, founded earlier, pioneered many of the principles of university education that they represent. All these universities pay less regard to the traditional divisions between faculties, so that students may take new kinds of courses. Most of their students live in residential colleges. They have spacious out-of-town sites and well-planned buildings.

Technological universities. In 1966 and 1967, the ten colleges of advanced technology in England and Wales and the Heriot-Watt College in Scotland achieved university status. Two of these colleges became affiliated to existing universities. Chelsea College of Science and Technology became a college of the University of London, and the Welsh College of Advanced Technology became part of the University of Wales. The other nine colleges became independent universities. These universities stress technology and applied science. Most also offer courses in the social sciences. *Sandwich courses* are a feature of technological universities. In these courses, students alternate periods of full-time study with full-time practical training in industry.

In 1975, the University College at Buckingham, the UK's only recently founded independent university, came into being. It grants *licences* which are equivalent to first degrees awarded by other universities. The University College at Buckingham lies outside the system of normal state funding.

The Open University developed in the UK during the early 1970's. It provides degree courses by correspondence for students working mainly at home. The courses are supported by a large range of books and radio and television broadcasts. Open University students may also attend local study centres and meet tutors or other students. See **Open University.**

Going to a university. When admitting students, UK universities are concerned only with their ability to complete successfully a course of studies, not with their nationality, religion, or sex.

University places. The United Kingdom has fewer university *places* (vacancies for students) in relation to the total population than have many other countries. In the early 1990's, for every 10,000 people, the UK had fewer than 50 full-time students taking degrees. As a result, competition for places in UK universities is intense.

Entrance requirements. To qualify for *matriculation* (admission to university membership), a candidate must have certain minimum academic qualifications. Universities rely mostly on the results of A-level examinations in England and Wales, the Scottish Certificate of Education, and the Northern Ireland General Certificate of Education. A student may not be formally matriculated until after he or she enters a university.

Grants and scholarships. Today, few people are prevented from going to a university by lack of money. Some students may gain scholarships from universities or the government. Local education authorities supplement university awards with additional grants. They also make grants automatically to students accepted by a university for a first-degree course. These grants cover the cost of maintenance as well as tuition fees. But their value is related to the income of the students' parents. Loans are available to students at low rates of interest. Postgraduate students can also obtain grants from such bodies as the Science and Engineering Research Council or the Department of Education and Science.

The UK government pays university tuition fees for students from other countries in the European Community (EC). Students from countries outside the EC generally receive financial aid from their own governments, from an organization in their own country, or from their parents. But the British Council offers scholarships to overseas students (see **British Council**). The UK government schemes also give several hundred Commonwealth students each year the opportunity to take advanced courses in the UK as Commonwealth bursars, scholars, or fellows.

Courses of study. The range of subjects from which a student may choose increased greatly in the 1950's and 1960's with the inclusion of the social and applied sciences in the curricula of the universities. All universities offer courses in major subjects such as English, mathematics, and history. Most universities also provide courses in a wide variety of other subjects and combinations of subjects. A student can get more complete information from *calendars* and *prospectuses* published by individual universities.

Methods of teaching and study vary from university to university and from subject to subject. Universities use lectures, tutorials, and seminars as teaching methods. But the extent to which each method is used varies. In Scottish universities, the lecture is the most important

Teacher-training students at a college of higher education use drama as a part of their coursework.

form of teaching. In Oxford and Cambridge, the tutorial is the main method. The newer universities favour the tutorial and the seminar over the lecture. Overall, the number of teaching staff in proportion to the number of students is higher than in many other countries.

Graduation. When the student has passed a final examination, he or she is qualified to receive a degree. But students cannot use the letters BA (Bachelor of Arts), BSc (Bachelor of Science), and so on, until they have been formally admitted to the degree. This process is called *graduation,* a dignified and colourful ceremony. The *dean* (chief member of staff) of the faculty presents each student, wearing full academic robes, to the chancellor or vice chancellor of the university. The chancellor or vice chancellor admits the student to the degree and may speak a word of praise and welcome, sometimes in Latin. The degrees that the students receive at the graduation ceremony are known as *first degrees.* They are the various kinds of *bachelor's degrees* and, in Scotland, the *master's degrees.* A first degree marks the end of a student's undergraduate work.

Postgraduate work involves further formal study or research after graduation. London University, with its many specialized research institutes, has a large proportion of postgraduate students. Other universities are rapidly expanding their research facilities. Much more money is available for research in scientific subjects and engineering than in arts subjects. Organizations such as the Nuffield Foundation provide funds for research in arts subjects and social sciences. Postgraduate students do research work for a *higher degree.* They submit their work as a *thesis* (written dissertation), which they defend in a *viva* (oral examination).

Higher degrees of various levels are awarded for postgraduate work. The master's degree is awarded for one or two years' postgraduate work. The degree of Doctor of Philosophy is awarded for research taking at least three years that represents a significant contribution to knowledge in the particular subject. Higher than the degree of Doctor of Philosophy are doctorates awarded to people for their published works. People rarely gain a senior doctorate before they reach the age of 40.

Universities sometimes award higher degrees to distinguished men and women whom they wish to honour. These people need not have academic qualifications. For example, a distinguished orchestral conductor may receive the honorary degree of Doctor of Music.

Administrative authorities. The universities of the United Kingdom are independent, self-governing bodies. The universities decide what subjects they teach, what degrees they award, what standards they maintain, and what staff they appoint.

Major officials. The head of a university, called a *chancellor,* is a person of great distinction and is elected for life. The chancellor presides at large meetings and confers degrees at the graduation ceremony. Each of the four ancient Scottish universities has a *rector,* elected by the matriculated students of the university every four years. All these posts have great dignity but few duties.

The *vice chancellor* is the chief executive and administrative officer. This post is permanent, except at Oxford, Cambridge, London, and Wales. The administrative officer at London is called a *principal.*

The *registrar,* or *secretary,* prepares the business of various committees and signs official documents.

Governing and advisory bodies. The highest academic body in most universities is the *senate.* Its chairman is the vice chancellor, and its members are professors of the university and other members of the teaching staff. The senate makes decisions about the form and content of university courses, and considers any proposals for changes.

Apart from the academic authority, the two main governing bodies are the court and the council. The *court* is a general supervisory body. It is generally large and includes representatives of various bodies outside the university itself, such as the various Churches, the local education authority, and learned societies. The *council,* in most universities, deals with external relations and financial matters and is the formal employer of the university staff. This general administrative pattern varies greatly in detail from university to university.

All universities have a statutory body to which all their graduate members belong. In most cases, it is called the *convocation.* Its powers vary.

The students are usually represented on the senate and the council, and other university bodies, by a small number of student union officers or elected student members. Otherwise, undergraduates play no direct part in conducting university affairs, except in Scottish universities, where they elect the rector. But they have several ways of bringing their opinions to the notice of the authorities. Regular publications, such as student newspapers, are one of the most important ways.

Colleges of higher education are former teacher training, art, and further education colleges. Many of these colleges merged with universities or polytechnics but 50 became free-standing diversified colleges of higher education. Many offer degree courses, though the degrees are awarded by other higher education institutions. In 1993, 140,000 students attended degree courses at these colleges.

University finance. After 1919, state funds were channelled to universities through the University Grants Committee (UGC), made up of professors and other people concerned with education. In 1989, the UGC was reconstituted as the Universities' Funding Council (UFC), with a higher proportion of nonuniversity members. In 1992, the UFC was combined with the funding body for polytechnics and colleges as a single Higher Education Funding Council (HEFC).

Administration of education

The Parliament in London decides how the educational systems of England, Northern Ireland, Scotland, and Wales shall be administered. Parliament passes separate acts for each system.

Administrative authorities. A senior member of the government is responsible for each educational system up to the secondary school level. In England, this person is the secretary of state for education and science, who is also responsible for university education throughout the United Kingdom. In Northern Ireland, the secretary of state for Northern Ireland directs educational affairs. The secretary of state for Scotland has overall responsibility for the Scottish educational system. The secretary of state for Wales is responsible for Welsh schools.

Each minister is the head of an education department. The departments are the Department for Education (DFE), formerly the Department of Education and Science (DES), Scottish Education Department (SED), and Welsh Office Education Department (WOED). They are staffed by *civil servants* (government employees).

Until 1992, Her Majesty's Inspectorate of Schools (HMI) founded in 1839, advised ministers on educational matters through their Senior Chief Inspector (SCI). The Education (Schools) Act (1992) introduced privatized inspection. An independent office of Her Majesty's Chief Inspector, the Office for Standards in Education (OFSTED), was established. The new inspection teams, consisting of registered full- or part-time inspectors, carry out four-yearly inspections of all schools. The post of Senior Chief Inspector was abolished and HMI's were reduced in number.

Local authority inspectors are employed by LEA's to ensure that standards are maintained. Schools may now buy in advice. Under the Education (Schools) Act (1992), LEA inspectors can tender for inspection of grant-maintained and independent schools as well as schools in neighbouring authorities. They still monitor the National Curriculum.

Each minister supervises the financing of public education and coordinates the work of local education authorities. They ensure that the buildings are suitable, that there are enough teachers, and that the schools and colleges are efficiently conducted. The local education authorities are the elected councils of local government areas of the UK. They administer local government services through specially appointed committees.

By law, each of the councils must appoint an education committee. This committee consists mainly of council members, but it may also include other local citizens and teacher representatives. Each council must also employ a chief education officer, with administrative and other staff.

Financial administration. All four educational systems are paid for partly with money voted each year by Parliament from national taxes, and partly with funds raised from taxes collected by their local authorities.

The teaching profession

There were about 550,000 full-time teachers in state-run schools and further education establishments in the UK in the early 1990's. The ratio of pupils to teachers, which indicates average class size, was about 18 to 1.

Training and qualifications. Most primary and secondary schoolteachers in the UK are trained in universities or higher education institutes. The majority are graduates who take a one-year full-time course for the *Post Graduate Certificate of Education* (PGCE). A smaller number qualify by means of a Bachelor of Education (B.Ed.) degree. *Licensed teachers* do not require a degree, but they must have spent at least two years in higher education. *Articled teachers* are graduates who spend four-fifths of their time under the supervision of a mentor in the classroom, one-fifth in a college.

Thousands of teachers and lecturers also work in independent schools, colleges of higher education, polytechnics, and universities. Training for teachers in further and higher education is not compulsory in the UK. Different teacher training arrangements exist in Scotland and Northern Ireland.

The teaching staff of universities are selected from people with high academic ability. Universities are increasingly demanding that people they select should also have experience in postgraduate research and have a higher degree. The grades of staff, in ascending order of seniority, are *lecturer, senior lecturer, reader,* and *professor.* The professor is responsible for organizing teaching in his or her subject. About one in ten of all university teachers is a professor. A professor may also be the head of a department, particularly if he or she is the only professor in a subject.

Travel schemes and refresher courses. Many short courses, often called *refresher courses*, are planned for serving teachers. These courses may last a few days or several weeks. They are provided by the ministries, local education authorities, universities, and teachers' professional organizations. Sometimes teachers are granted a *sabbatical* term or year on full pay so that they may engage in study or research. Each year about two hundred teachers teach in the United States or Commonwealth countries through exchange schemes. Teachers from these countries replace them in the UK.

Salaries and professional associations. The 1987 Teachers' Pay and Conditions Act marked the ending of the Burnham Committee, which had been responsible for dealing with teachers' pay and conditions since 1919. The 1987 Act stipulated that teachers should be employed for a minimum of 1,265 hours per annum. Arrangements and regulations governing teachers' pay are now managed by the School Teachers' Review Body.

Most teachers belong to professional associations that work to obtain good salaries and working conditions for teachers and to maintain professional standards. The main associations in England and Wales are the National Union of Teachers (NUT), the National Association of School Masters and the Union of Women

Teachers (NAS/UWT), the Association of Masters and Mistresses Association (AMMA), and the Association of Teachers and Lecturers (ATL). Headteachers are separately represented by the National Association of Headteachers (NAHT) and the Secondary Heads Association (SHA). In Scotland, the largest union is the Educational Institute of Scotland (EIS), and in Northern Ireland, the Ulster Teachers' Union.

Research in education. A wide variety of research into education is done in the UK. The main research bodies are the National Foundation for Educational Research in England and Wales, the Scottish Council for Research in Education, and the Northern Ireland Council for Educational Research. Some universities and polytechnics carry out educational research.

History

The Middle Ages. Organized education began in Britain when early Christian missionaries established centres of learning. According to traditional belief, St. Patrick began Irish education in the A.D. 400's. Scottish education began when St. Columba founded a monastery on the island of Iona in 563. Organized education in England dates from 597, when St. Augustine established a cathedral at Canterbury, in Kent. In those early times, the Church provided all formal education. This system lasted for about a thousand years.

The early missionaries established two kinds of schools—*grammar schools* and *song schools.* Both were for boys and men only. Girls were trained at home in household affairs. Grammar-school education was based on Latin, the language used by educated people throughout Europe. Song schools trained boys to sing in church choirs and to help in church services.

By the 700's, some grammar schools, such as the one at York, taught the whole range of medieval learning.

In the 1100's and 1200's, distinguished teachers established schools at Oxford and Cambridge that later became universities. They were the only universities that existed in England until those of Durham and London were founded in the 1830's. Three universities were founded in Scotland in the 1400's. They were St. Andrews (1410), Glasgow (1451), and Aberdeen (1494).

The universities provided higher education, and the grammar schools began to concentrate on preparing boys for entry into universities. But in the Middle Ages, many children did not go to school. The nobles educated their sons at home, and skilled craftworkers trained apprentices in their workshops. Children received some kind of elementary education from priests.

The first attempts to provide education for all children were made in Scotland. In 1494, the Scottish Parliament ordered a school to be set up in every parish but few were established. During the next 200 years, the Scots tried to establish a national system of education.

From 1500 to 1750. During the Reformation in England, Henry VIII and Edward VI closed many church schools. Henry, Edward, Queen Mary I, and Queen Elizabeth I refounded some schools. But the grammar-school system did not fully recover until the 1900's.

The people who worked for a national system of education in Scotland had a notable success in 1696. In that year, Parliament passed the Act for the Settling of Schools, which required the landowners in every parish to provide a school and pay the teacher. These *parochial schools* were attended by both rich and poor children, and they gave both primary and secondary education.

In England, the Society for Promoting Christian Knowledge (SPCK), founded in 1698, made the first attempt to provide a national system of education. Between 1700 and 1750, the SPCK established thousands of *charity schools.* They received this name because wealthy people provided them for children of poor people. The main purpose of the charity schools was to give religious instruction. But, first, the children had to be taught to read. Some schools taught only reading. Some also taught writing and arithmetic, and others gave instruction in manual or domestic skills.

From 1750 to 1870. During the second half of the 1700's, England rapidly became industrial. Children as well as adults were employed in factories and mines. They could not attend school on weekdays, so Robert Raikes and other people established *Sunday schools.* These schools taught little except reading and religious instruction (see **Raikes, Robert**).

The newly industrial country needed men and women who could read, write, and calculate with numbers. From the beginning of the 1800's, enlightened politicians began to agitate for a national system of education. Andrew Bell and Joseph Lancaster discovered how to provide elementary education cheaply by using pupils as teachers. In their system, one adult supervised the whole school and *monitors* taught the classes.

Two voluntary societies were formed in the early 1800's to establish *monitorial schools,* using the methods of Bell and Lancaster. They were the British and Foreign School Society and the National Society for Promoting the Education of the Poor in the Principles of the Established Church.

In 1833, Parliament gave the two societies 20,000 pounds to help them to build schools. After this date, the grant was given annually. In 1839, the government claimed the right to inspect the schools to which it gave grants. It set up a Committee of the Privy Council on Education to ensure that the money was properly used. James Phillips Kay, who became Sir James Kay-Shuttleworth, was appointed as secretary. Kay-Shuttleworth replaced the monitorial system by class teaching. He encouraged schools to broaden their curriculum and improved the supply and training of teachers.

From 1870 to 1944. An important advance in the establishment of national education took place in 1870. Parliament passed England's first Education Act, which gave local *school boards* powers to provide elementary schools out of rates and taxes. A similar act was passed for Scotland in 1872.

Progress in setting up a national system of education in England and Wales was rapid. Schooling was made compulsory in 1880. In 1891, most elementary education was made free. The Technical Instruction Act of 1889 made possible a national system of vocational education for adults.

The Education Act of 1902 gave *local education authorities* powers to provide secondary schools. The local education authorities were county councils and borough councils, which replaced the school boards. Between 1880 and 1909, seven new universities were created: Birmingham, Bristol, Leeds, Liverpool, Manchester, Sheffield, and the University of Wales.

After World War I (1914-1918), three official reports provided the basis for the organization, curricula, and methods of primary and secondary schools today. They were *The Education of the Adolescent* (1926), *The Primary School* (1931), and *Infant and Nursery Schools* (1933). The first report proposed that primary education should end at about the age of 11, after which *all* children should go on to secondary education. The other two reports recommended the more informal and active methods of teaching used today in primary schools.

Education in Scotland after 1872 had the same general development, but in different ways and at different stages. In 1923, the Northern Ireland Parliament passed an Education Act.

From 1944 to the 1990's. Secondary education was not available for everyone until after World War II (1939-1945). It was made free and compulsory by Education Acts passed in 1944 for England and Wales, 1945 for Scotland, and 1947 for Northern Ireland.

Education throughout the UK greatly expanded after World War II. More and more children stayed longer at school, the number of university students more than trebled, and four times as many teachers completed their training each year. In 1972, the school-leaving age was raised from 15 to 16.

The availability of secondary education for all children raised the problem of how best to educate young people in schools other than grammar schools. The trend has been to give more attention to social training, to use less formal methods in teaching academic subjects, to develop practical subjects, and to provide semi-vocational courses for older pupils.

For much of the late 1960's and the 1970's, comprehensive secondary education was national policy. In this system, all children pass automatically from primary schools to secondary schools without taking a selection examination. Most local education authorities reorganized their secondary schools to adopt this system.

By the 1980's, teachers in both primary and secondary schools were using computers, films, radios, televisions, and videotape recorders as teaching aids.

Since 1979, there has been a strong move toward centralism, with governmental intervention in the education system. The 1984 and 1986 Education Acts allowed government to allocate money to LEA's for specific purposes, thus reducing LEA control. The 1988 Education Reform Act introduced the National Curriculum and testing in schools, the setting up of separate curriculum and school examinations councils, increased the power of parents to choose schools, and delegated finances away from LEA's to schools by local management of schools (LMS). It also introduced grant-maintained schools and City Technology Colleges, and abolished the largest education authority, the Inner London Education Authority (ILEA).

In 1991, "parent power" was reinforced by the government publication *The Parent's Charter: you and your child's education.*

In 1992, the controversial Education (Schools) Act required schools and LEA's to publish examination performance league tables. The distinction between polytechnics and universities was abolished the same year.

Schools founded long ago, such as Eton College, retain many traditions. But they can still provide a modern education.

Related articles. See **Education** and its list of *Related articles.*

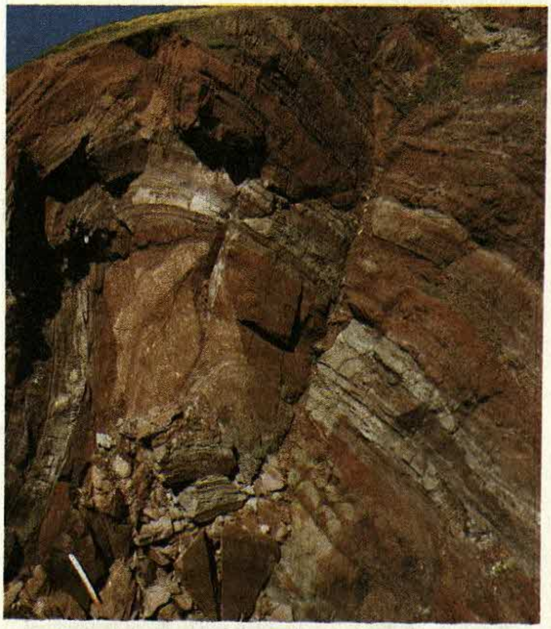
General Certificate of Education
General Certificate of Secondary Education
Kindergarten
Nursery school
Open University
School
University

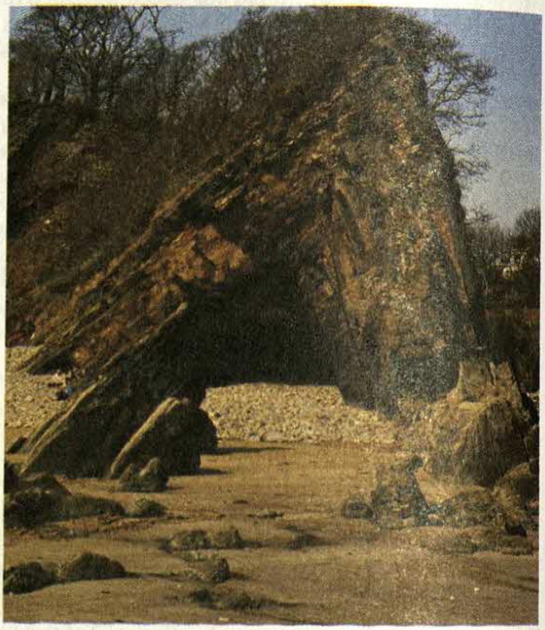
Outline

- **I. Characteristics**
- **II. Schools**
  - A. Organization and administration
  - B. Nursery schools
  - C. Primary schools
  - D. Secondary schools
  - E. Special schools
- **III. Further education**
  - A. Vocational education
  - B. Other types of further education
  - C. Administration
- **IV. Higher education**
  - A. Polytechnics
  - B. Universities
  - C. Going to a university
  - D. Administrative authorities
  - E. Colleges of higher education
  - F. University finance
- **V. Administration of education**
  - A. Administrative authorities
  - B. Financial administration
- **VI. The teaching profession**
  - A. Training and qualifications
  - B. Travel schemes and refresher courses
  - C. Salaries and professional associations
  - D. Research in education
- **VII. History**

Questions

What was a *charity school*?
What is meant by *post graduate study*?
Why is physical education important at primary school?
What general characteristics do the four state education systems in the UK have in common?
What is meant by *block release*? *Thick sandwich*?
How did Bell and Lancaster provide elementary education cheaply?
What are the responsibilities of a *chancellor*? A *registrar*?
What is the *National Curriculum*?
What is a *redbrick* university?
When was secondary education made free and compulsory.





At Cobbler's Head in Dyfed, South Wales, the sandstone rock, *above left,* has a *fault* (fracture). Saundersfoot anticline, *above right,* is a fold in rock, and is also in Dyfed.

Geology of the United Kingdom

United Kingdom, Geology of the. This article discusses the geology of the geographical region known as the *British Isles,* which consists of the United Kingdom and the Republic of Ireland. The British Isles has a wide variety of rocks and scenery. The Antrim plateau in Northern Ireland and the Cuillin Hills of Skye in Scotland are the relics of ancient volcanic activity. The spectacular gorges, cliffs, and escarpments—such as those at Cheddar in Somerset, England; Matlock Tor in Derbyshire, England; and Eglwyseg Mountain in Clwyd, Wales—are composed of hard limestone rocks that were formed years ago under the sea. The Cotswolds of western England and the chalk downs of eastern and southern England consist of similar, but much softer, limestones. Part of the Pennines and the Midlands, in England, and southern Wales have scenery associated with sandstones. These sandstones represent the cementing together of vast accumulations of quartz, the toughest mineral in nature. Such features are a few examples of the outward and visible signs of the long and complex geological history of the British Isles.

Geology is the science that deals with changes in the earth. Geologists study the history of these changes. They also study the materials that form the earth's rocky crust. Geology has many uses in everyday life. Engineers depend on geological information. Blocks of flats, huge dams, and other constructions must be built on firm foundations. Geologists can tell engineers whether the rocks on or near a building site are stable. To locate water supplies, the engineer requires geological information.

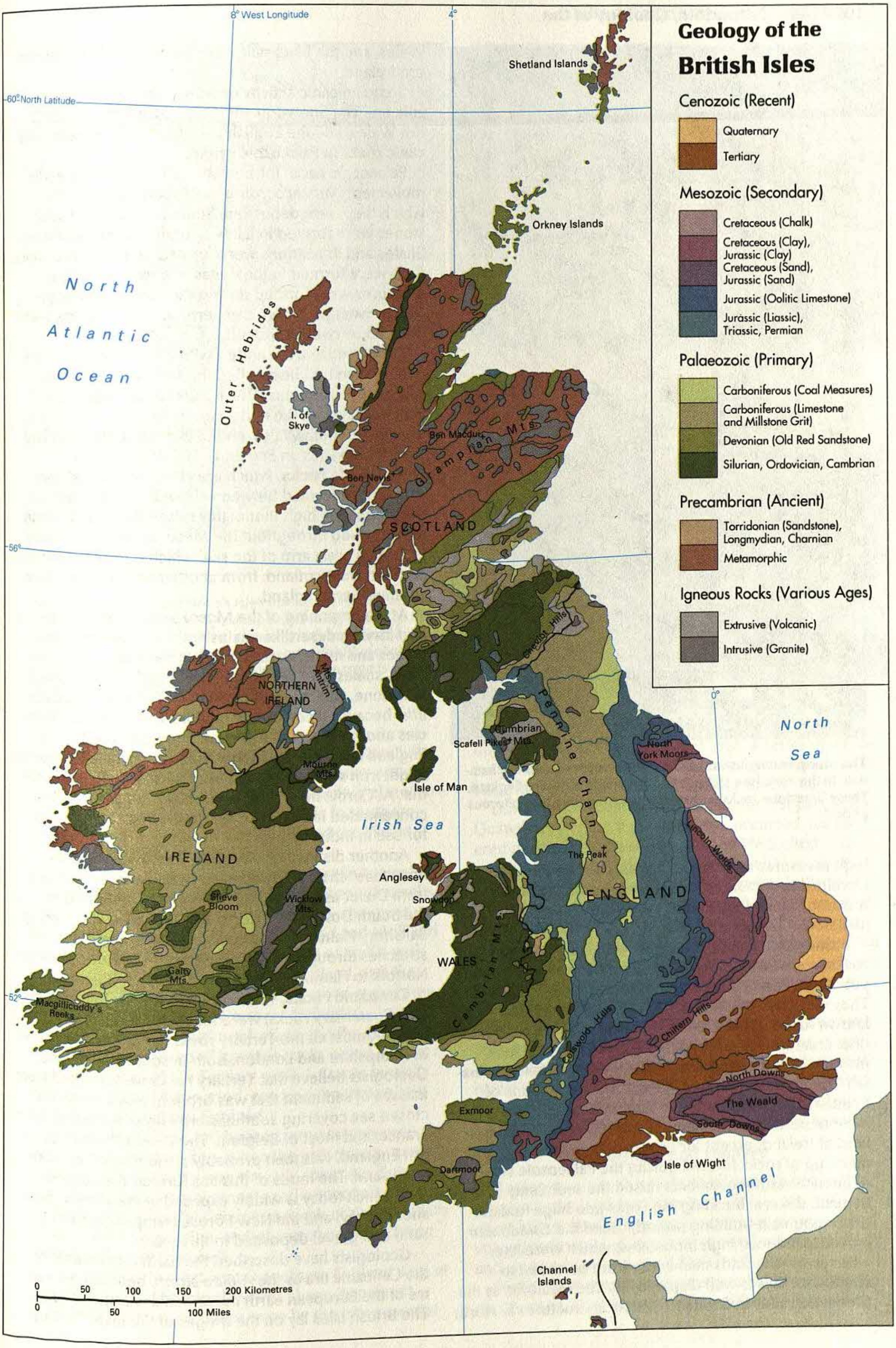
For further information on geology as a subject, and its uses, see **Geology,** with its list of *Related articles.* For the geological history of the earth, see **Earth.** For information about minerals and rocks, see **Mineral** and **Rock,** with their lists of *Related articles.*

The geology of the British Isles

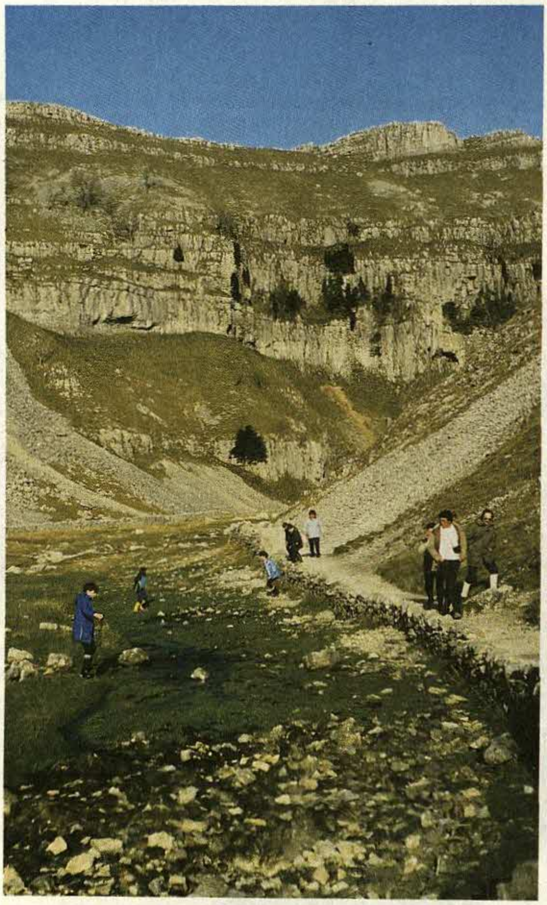
The British Isles has examples of rocks and scenery from almost every period of geological time. In general, the oldest rocks of the British Isles lie in the northwest. Towards the south and east, the rocks are more recent in origin.

Geologists believe that the first rocks to be formed were *igneous* rocks (rocks formed from molten material). Rivers flowing from ancient mountains wore away the land. The rivers carried broken fragments and other *eroded* (worn away) material into the sea. The material settled on the bottom of the sea. Over periods of time lasting millions of years, layer upon layer of *sedimentary* rocks were built up. Earth movements of enormous power raised the sedimentary rocks high above the sea to form new mountains. These new mountains were then worn down and new sedimentary rocks were formed.

Precambrian rocks is the term used by geologists to describe the oldest rocks of the British Isles. Precambrian rocks were formed more than 600 million years ago. Ancient Precambrian sediments, called *Torridonian sandstones,* are found along the coast lands of the northwestern Highlands of Scotland. The Torridonian layers rest on *metamorphic* rocks, such as the Lewisian gneisses in the Outer Hebrides. Metamorphic rocks are rocks that have been completely changed by extremely



Geology of the British Isles



The steep escarpment of Gordale Scar overlooks Malhamdale in the Yorkshire Dales National Park, in northern England. These limestone rocks were formed during the Carboniferous period.

high pressures and temperatures. The Malvern Hills of Hereford and Worcester, England, consist of highly metamorphosed Precambrian rocks. Precambrian rocks also occur in Anglesey, Wales.

Palaeozoic rocks, which are also called *primary* rocks, were formed between about 600 and 225 million years ago. Palaeozoic rocks are mainly sedimentary. They were laid down in a sea, in which the earliest known forms of life existed. The skeletons of these extinct creatures became part of the sedimentary rock, forming fossils called *graptolites* and *trilobites* (see **Fossil**). The mountain ranges of the southern uplands of Scotland, the Lake District in England, the Isle of Man, most of northern and central Wales, and most of the island of Ireland, except for an area in the northeast, are made up of rocks formed during the Palaeozoic era.

Intense earth movements raised the sediments from beneath the sea, buckling the rocks into huge folds. A great mountain-building period, called the *Caledonian period,* produced high mountains, which were later worn away. The folds mainly ran from northeast to southwest. This is well displayed by such features as the Glen Mór valley in Scotland, the rock structures in North Wales, and the Blackstairs mountain range in southeastern Ireland.

Some volcanic activity occurred during the Palaeozoic era. The Snowdon and Cader Idris areas of northern Wales, and the English Lake District, have some volcanic rocks of Palaeozoic origin.

Palaeozoic rocks formed after the Caledonian earth movements vary according to the conditions under which they were deposited. Some red-coloured sandstones were formed in lakes or under desert conditions. Shales and limestones were formed on the beds of seas. Grits were formed in the deltas of huge rivers. Coal measures were formed during the Carboniferous period in swamps, where tree ferns and other plants were covered by river sediments.

The Palaeozoic era ended with another great period of mountain building, called the *Hercynian* or *Armorican* earth movements. These caused east-west folds, well displayed in the Kerry mountains of southwestern Ireland, in South Wales, and in Exmoor, Dartmoor, and the Mendip Hills, in England.

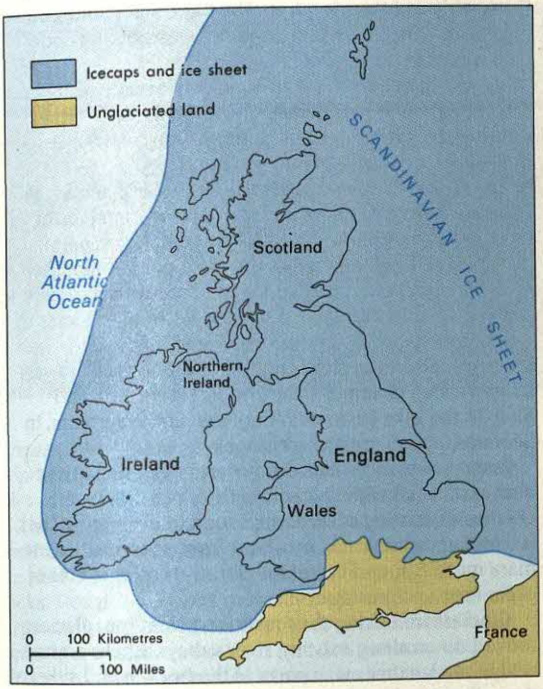
Mesozoic rocks, which are also called *Secondary* rocks, were formed between about 225 and 70 million years ago. The high mountains raised by the Hercynian period stood throughout the Mesozoic era. Mountains isolated a great arm of the sea, which covered northern England and Scotland, from another sea in what is now southwestern England.

At the beginning of the Mesozoic era, the climate was *arid* (dry). In desertlike basins and salt lakes, red sandstones and marls were formed. In the seas, limestones, clays, shales, and sandstones were laid down. Jurassic limestone, which was formed at this time, is called *oolitic,* because it consists of millions of tiny, round particles about the size of fish roes. The Cotswold Hills in England are made up of this yellowish-brown limestone. Slight iron staining around each particle causes the colour. At Corby, in Northamptonshire, England, the highly concentrated iron occurs near the surface. It is mined for use in industry.

Another distinctive Mesozoic rock is *Cretaceous limestone* (chalk). In southeastern England, it stretches from Dover as the North Downs and from Eastbourne as the South Downs. The North and South Downs meet on Salisbury Plain. Also in England, another band of chalk stretches through the Chiltern Hills, from Hunstanton in Norfolk to Flamborough Head in Humberside.

Cenozoic rocks, which are subdivided into *Tertiary* and *Quaternary* rocks, were formed in the last 70 million years. Almost all the Tertiary rocks are in the two basins of Hampshire and London, both in southern England. Geologists believe that Tertiary rocks were formed from masses of sediment that was brought into a partly enclosed sea covering southeastern England, northeastern France, and most of Belgium. The Weald, in southeastern England, was then probably a submerged shoal or low island. The muds of this sea formed the London clay, which today is widely exposed at the surface. Bagshot, Surrey, and the New Forest, Hampshire, exhibit sand and gravel deposited in this sea.

Geologists have described the earth movements of the Cenozoic era as the *Alpine storm,* because the centre of the European earth movements was in the Alps. The British Isles lay on the fringes of the main folding



Ice covered most of the British Isles during the Pleistocene Ice Age. The ice wore away deep, steep-sided valleys, such as the Nant Ffrancon valley, in Wales, *above right.* Some beaches formed at the time of the glaciers are now *raised beaches,* well above sea level. The raised beach shown on the right is on Jura, an island off the west coast of Scotland.

away from the most violent activity. For this reason, the hills and mountains formed in the British Isles were much smaller than the giant ranges raised up elsewhere. But the east-west direction of rock folds in southern England, such as in the Isle of Wight and the Weald, shows these earth waves well.

In Scotland, where the earth waves broke against old, resistant blocks, molten lava welled up through cracks and poured out over the land. In this way, the great volcanic flows of Antrim in Northern Ireland and Mull and Skye in Scotland were formed. The Isle of Staffa, with Fingal's Cave, off the west coast of Scotland, and the well-known Giant's Causeway were formed at this time (see **Giant's Causeway** in Northern Ireland.).

Slieve Gullion in Northern Ireland and the Cuillin Hills of Skye are composed of igneous rocks called *gabbros* and other rocks of the Tertiary period. Cracks in rocks, filled with lava of this period, can be seen throughout Scotland and northern England.

The Quaternary period began comparatively recently, about a million years ago, when the present-day geological structure of Britain was virtually complete. Subsequent earth-folding movements and earthquakes were slight. But changes did occur as a result of rises and falls of sea level, of glaciation, and of ceaseless *denudation* (wearing away of the land).

The sea level in what is now southern England was, at one time, several hundred metres above its present level. As a result, rocks were worn by the movement of tides and waves. When the land rose, a series of wave-cut platforms was exposed. Each platform marked a stage in the uplift of the land relative to the sea.

During the Pleistocene epoch, in the first part of the Quaternary period, a great Ice Age occurred. Ice covered most of the British Isles. As the ice melted, it deposited layers of sands and clays, in which boulders were embedded, on large areas of lowlands. Parts of this covering have been worn away. But large areas of glacial deposits still remain in England in East Anglia, the eastern Midlands, the low ground to the east of the Pennines, and the Lancashire-Cheshire plain. Glacial material is also extensive in the English Lake District, in Scotland, and in Ireland. See **Ice Age.**

The chief types of recent deposits include alluvium, such as in the Fens, England; peat, such as in the Lancashire plain, England; wind-borne material called *brickearth,* such as in northern Kent, England; and material deposited on present-day beaches. This material includes sand and pebbles deposited by ocean currents.

Geology and scenery

Geologists study the rocks that form the earth. They also study the land forms on the earth's surface. They study how major forces, such as earth movements and volcanic activity, and forces of erosion, such as glaciers and rivers, shape and mould the landscape.

Earth movements originate mainly from within the earth's crust. They often produce differences in elevation on the earth's surface. Geologists call the forces that cause earth movements *tectonic forces.* These forces include *faulting* (cracking as a result of tension or extreme compression) and *folding* (buckling of the rocks into upfolds and downfolds).

Everyone has seen fractures and contortions of rocks in exposed cliff faces, in quarries, or in road or rail cuttings. On a much larger scale, the Glen Mòr valley in Scotland and the Bala and Tal-y-Llyn valley in Wales are great clefts in the earth's surface resulting from earth movements. The rocks along these valleys have been shattered. For this reason, they are easily eroded. Rivers tend to flow in the same direction as the fault lines.

The Central Lowlands of Scotland represent a major dislocation and collapsing of the earth's crust between two roughly parallel fault systems. The English Weald is a worn-down *anticline* (upfold) and the London Basin is a *syncline* (downfold). In North Wales, the summit of Snowdon, 1,085 metres above sea level, is the base of a major downfold. The corresponding upfold to the south was worn away.

Changes in the relative elevation of land and sea took place slowly throughout geological time. Uplift of the land has produced a series of flat-topped plateaus separated by steps. These plateaus can be seen in many parts of the British Isles, especially in the north and west. When, at other times, the land surface falls relative to the sea, the sea floods the lower reaches of valleys. In this way, the coastline becomes indented. Bantry and Dingle bays, in southwestern Ireland, and Milford Haven, in southwestern Wales, are examples of coastal submergence.

Earth movements sometimes tilt horizontal layers of sedimentary rocks. The forces of erosion wear away the softer rocks, exposing the harder rocks. In this way, a *cuesta* (belt of hills) develops. A cuesta consists of an *escarpment* (steep face) and more gentle back slope. The belt of Jurassic rocks that tilt to the south and east have escarpments of limestone in southern England, in the Cotswolds and the Mendips. The tilted sandstones of the North Yorkshire Moors, in northeastern England, face west and northwest.

Volcanic activity. Volcanic activity usually occurs at the same time as major earth movements. Lava sometimes erupts and flows on the earth's surface. Sometimes the lava solidifies underground.

The Giant's Causeway in Northern Ireland and Fingal's Cave on the Isle of Staffa are spectacular examples of outflows of basaltic lava that have set in huge columns (see **Basalt**). The Whin Sill in the northern Pennine Hills consists of molten rock that forced its way into sedimentary rocks and solidified underground. Similar bands of tough igneous rocks abound in western Scotland. Granite is formed by the slow cooling of molten rock in vast subterranean chambers. Dartmoor, Land's End, and Shap in the Lake District, in England, and Aberdeen, in Scotland, are all granite areas.

Intense pressures caused by earth movements and heat associated with volcanic activity can completely change an existing rock. Slate, found in northern Wales, is a metamorphic rock, resulting from pressure. Connemara marble, found in Ireland, illustrates the effects of great heat on limestone.

Glaciation. During the Pleistocene Ice Age, glaciers moved down along existing river valleys. Rocks embedded in the ice tore away parts of the bottom and sides of the valleys. In this way, the valleys were straightened and deepened into a U-shape. Nant Ffrancon valley in northern Wales and the Great Langdale valley in the Lake District are almost perfect U-shaped valleys. When the ice melted, the mass of rocks and soil pushed in front of the glacier was left piled up across the valley as a *terminal moraine* (see **Moraine**). Sometimes the moraine acted as a dam holding back the melted glacier water.

Near the summits of the mountains, huge, craterlike, semicircular depressions with steep, rocky walls were formed. These depressions, called *corries, cwms,* or

Undercutting of these cliffs results from erosion by the sea. The cliffs, of sandstone, are near Sandown on the Isle of Wight.

The gullies on these cliffs are lines resulting from marine erosion. The limestone cliffs are at Portland, in Dorset, England.

Arthur's Seat, in Edinburgh, Scotland, consists of two volcanic *vents* (holes), through which molten lava once flowed. Arthur's Seat resembles a resting lion. The left vent is called *Lion's Head* and the right vent, *Lion's Haunch.*

cirques, were the birthplaces of glaciers. Many of these depressions can be seen in highland areas of the British Isles, especially in Wales and the Lake District.

The massive ice sheets that moved across the North Sea from Scandinavia produced other land forms. The ice sheets churned up material from the underlying rocks. This material was basically clay, which contained large and small boulders. Oval shaped mounds of boulder clay are called *drumlins.* Drumlins are common throughout the Republic of Ireland, in the Lough Neagh district of Northern Ireland, in the Central Lowlands of Scotland, and in the Vale of York in the northern part of England.

Processes of erosion. The glaciers and ice sheets of the Ice Age left striking land forms throughout most of the British Isles. But the ceaseless processes of erosion, such as running water and the sea, continue to shape and mould land features.

The main agent of erosion is running water. The whole of the British Isles, except for certain limestone districts, is covered by a network of rivers and streams. Mountain streams sweep rocks and other loose material downhill. The rubbing action of boulders against the bed of the stream deepens the valley, giving it a V-shape in cross section. Beyond the mountains, the gradient of the valley becomes less steep. The river tends to swing in meanders, engaging in sideways erosion. The river eventually deposits the material it was carrying.

The sea is also a powerful agent of erosion. Armed with loose boulders and stones, the sea pounds away at the base of cliffs, undercutting them and causing them to collapse.

Geology and soils

The process of weathering breaks up rock in various ways. The alternate freezing and thawing of water in the joints of rocks tends to widen cracks and eventually break up the rock. Weathering also occurs because rainwater is a mild carbonic acid, which causes rocks to crumble. Such processes create a cover of loose material in which vegetation can grow and from which soil can develop.

Geologists used to classify soils according to the rock from which they were formed. But Soviet scientists established that soils were best classified according to the processes by which they had developed. Such processes are controlled largely by climate. The soils of the British Isles belong to two or three of the great world soil groups, because the British Isles lies within one major climatic region.

Rainfall in the British Isles exceeds evaporation. For this reason, the main movement of water in the soil is from the surface downward. Soluble material tends to be washed out of the surface layers and redeposited at lower levels. This process is called *leaching.* Leaching usually results in the formation of three distinct *horizons* (layers) in the soil, which make up the soil profile. The upper (*A*) horizon undergoes leaching. The next (*B*) horizon is where the finer materials and soluble salts from the *A* horizon are redeposited. Below is the *C* horizon, which is the bedrock that has been broken up by weathering and root action. This soil profile is that of a typical *podsol,* the most characteristic soil of the British Isles. Other soil types occur in Britain in the extremely wet areas, in the drier parts of the south and east, and in areas where the rock is of a special character, such as limestone. See **Soil.**

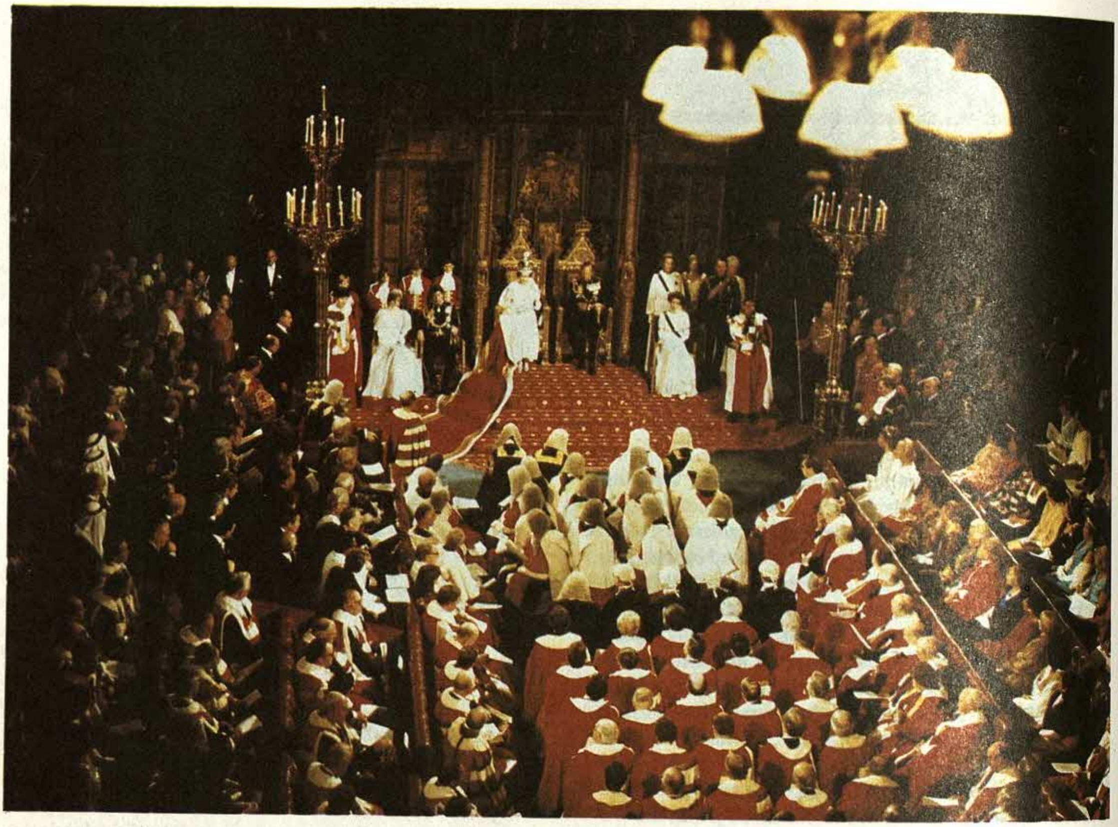
Study aids

Related articles. See the *Land* sections of articles on the counties and regions of the United Kingdom and the Republic of Ireland, such as **Hertfordshire** (Land), and *Land* sections of the articles on **England; Ireland, Republic of; Northern Ireland; Scotland;** and **Wales.** See also the following articles:

Ben Lomond
Ben Nevis
Broads
Cave
Cheddar
Cheviot Hills
Chiltern Hills
Coal
Cotswold Hills
Cuillin Hills
Downs
Exmoor
Flood
Glen Mòr
Hebrides
Lake District
Land's End
Lough Neagh
Man, Isle of
Mendip Hills
Mourne Mountains
Mull
Peak District
Pennine Hills
Slieve Donard
Snowdon
Weald
Wolds

Outline

I. The geology of the British Isles
  A. Precambrian rocks
  B. Palaeozoic rocks
  C. Mesozoic rocks
  D. Cenozoic rocks
II. Geology and scenery
  A. Earth movements
  B. Volcanic activity
  C. Glaciation
  D. Processes of erosion
III. Geology and soils



The state opening of Parliament is a colourful ceremony that takes place in the House of Lords each November. The monarch outlines the government's legislative programme for the new parliamentary session.

Government of the United Kingdom

United Kingdom, Government of the. The United Kingdom is a constitutional monarchy. The head of state is the monarch, who reigns but does not govern. The country is actually ruled by a Cabinet of democratically elected officials called ministers.

Parliament

Parliament is the supreme lawmaking body of the United Kingdom of Great Britain and Northern Ireland. It consists of the monarch, the House of Lords, and the House of Commons.

Before *bills* (proposed laws) can become *acts* (laws), they must be approved by both Houses of Parliament and must receive the *royal assent* (the formal approval of the monarch). In certain circumstances, the approval of the House of Lords is not necessary. Parliament meets in the Royal Palace of Westminster, which is better known as the *Houses of Parliament.*

The supremacy of Parliament. The courts must enforce all acts of Parliament. These acts cannot be set aside as being unconstitutional or for any other reason. By passing acts, Parliament can even alter the country's constitution. The only legal limit on the power of Parliament is that it cannot alter the succession to the throne without obtaining the consent of the other parliaments in the Commonwealth of Nations.

The monarch formally opens Parliament, *prorogues* it (brings one session of Parliament to an end), and *dissolves* it (brings the existing Parliament to an end). The monarch also completes the process of passing an act by giving the royal assent. The lord chancellor and the speaker normally announce to Parliament that the monarch has given the royal assent to a bill. By tradition, the monarch never acts without the advice of his or her ministers.

The House of Lords has no fixed number of members. But four groups of people are entitled to sit in the House of Lords: the 2 archbishops and 24 bishops of the Church of England, the law lords, hereditary peers, and life peers. The monarch formally appoints all bishops and also creates peers on the advice of the prime minister.

The lord chancellor, who is a member of the government and head of the *judicature* (judicial system), presides over the House of Lords both when it sits as a *legislative* (lawmaking) body and when it sits as a law court. The chief servants of the House of Lords are the clerk of the parliaments, who deals with records and procedure, and the gentleman usher of the Black Rod, who keeps order and takes messages to the Commons.

The House of Lords cannot originate, amend, or reject *money bills* (bills concerned solely with imposing taxes or authorizing the spending of public money). But otherwise the House of Lords shares with the Commons the work of passing bills and debating government policy. About one-third of all bills, including those that deal with the administration of justice, start in the House of Lords.

If the Lords rejects a bill that the Commons has passed, the Commons can pass the bill again in the next session. If the Commons then passes the bill a second time, the bill is not sent back to the Lords, but is submitted for the royal assent. In other words, the final power of the Lords is to impose about a year's delay on legislation. These rules are contained in the Parliament Acts of 1911 and 1949.

The House of Lords is the final court of appeal in civil lawsuits and, in special circumstances, in criminal cases. When it sits as a law court, only law lords attend.

The House of Commons consists of 651 members elected by the people.

The *speaker* of the House of Commons is a member chosen by the whole Commons to preside over meetings of the Commons (see **Speaker**). The *chairman of ways and means,* who is also deputy speaker, acts as chairman when the Commons sits as a committee. The speaker, or the chairman of ways and means, selects the next member to speak. The speaker or chairman tries to keep a balance between spokespeople for the government and the opposition and to preserve orderly debate. Two other deputy speakers help the speaker and chairman of ways and means. The speaker and the two deputies only speak in their official capacity, and they do not express an opinion on any matter.

The prime minister and members of the government sit on the front bench on the speaker's right. The leading members of the opposition sit on the opposite front bench. These members, on both sides, are known as *frontbenchers.* Behind them sit the *backbenchers* (rank-and-file members).

Contact between frontbenchers and backbenchers is maintained on both sides of the Commons by *whips.* Whips are members elected by their parliamentary parties to enforce discipline within the parliamentary party and to make sure that members are present in the chamber to vote on important issues.

The *leader of the House of Commons* is a member of the government who arranges the timetable and calendar of business of the Commons, in consultation with the chief whips of both sides. The chief servants of the Commons are the clerk and the sergeant at arms.

Government and opposition

The government is chosen from the majority party in the House of Commons. The head of the government is the *prime minister,* who is appointed by the monarch. But the monarch must choose the leader of the majority party. The prime minister chooses all other ministers. About 20 senior ministers form the *Cabinet,* which meets under the prime minister's chairmanship. The Cabinet determines government policy as a whole. All ministers must sit in one or other House of Parliament, and it is now accepted that the prime minister must sit in the Commons.

Only the Commons can impose taxes and grant money to the government. It does this by making finance laws that are effective for one year only. For this reason, no government can remain in office without the support of the majority of the Commons for longer than a year.

Her (or His) Majesty's opposition is the title of the largest minority party in Parliament. The *leader of the opposition* is elected by his or her fellow party members, but is paid a salary out of government funds. The

The prime minister leads the government, and is involved in all aspects of government policy. When Prime Minister John Major, *left,* visited Moscow in 1991, he discussed foreign policy with Mikhail Gorbachev, *second from right,* president of the Soviet Union.

opposition has the right to a fixed share of parliamentary time.

It is the duty of the opposition to criticize the government, to try to obtain concessions in government bills, and to present themselves to the nation as a possible alternative government. For this reason, the leading members of the main opposition party are popularly referred to as the *shadow cabinet.* Generally, each member of the shadow cabinet acts as a spokesperson for an area of policy that roughly corresponds to a government department.

Elections

Elections in the United Kingdom include *general elections,* held to choose the members of the House of Commons, and *by-elections,* held to replace a member who has died or retired. *Local elections* are also held for county and other local-government councils. Since 1979, the United Kingdom has also held direct elections to the European Parliament.

The vote. In general, a person must go personally to a *polling station* to vote in the United Kingdom. The polling station may be in a local school or similar building. It is open on polling day from 7 a.m. to 9 p.m. in a local election, or from 7 a.m. to 10 p.m. in a parliamentary election. People who cannot reach their polling station during an election can apply to vote by post or by *proxy.* A proxy is a person whom an absent voter authorizes to vote on his or her behalf.

All public elections are by secret ballot and use paper ballots. An official checks the voter's name on a list and gives him or her a ballot paper listing the names of the candidates. The voter goes into a private cubicle to mark the ballot paper. He or she puts a cross against the name of his or her preferred candidate and drops the paper into a locked ballot box. After the polling stations close, election officials count the votes marked on the ballot papers. The candidate who receives the most votes is elected.

The returning officer, who organizes the election, is a local-government official. His or her duties include publishing notices giving the date of the poll and the method of nominating candidates. The returning officer accepts the candidates' nominations and appoints *presiding officers* to supervise each polling station. The returning officer appoints assistants to help to count the votes, then supervises the count. He or she also rules on any doubtful ballot papers and decides whether a recount is necessary. The returning officer sees to the security of the ballot boxes and the secrecy of the count. He or she also announces the result.

The register of electors lists those people who are qualified to vote. It is published each November and operates from each February 15. Every person over 18 years old is entitled to vote in parliamentary elections, except for those without UK nationality, the monarch and some members of the Royal Family, members of the House of Lords, those in prison for serious crimes, people certified to be mentally unsound, and those who have been convicted of corruption at an election. Citizens of Commonwealth countries and of the Republic of Ireland can vote in UK elections if they live in the UK.

Parliamentary elections. The United Kingdom is divided into *constituencies* for parliamentary elections. Each constituency has one member of Parliament (MP). Official committees, called *Boundary Commissions,* decide the number of constituencies and their boundaries. The United Kingdom has a total of 651 constituencies—524 in England, 72 in Scotland, 38 in Wales, and 17 in Northern Ireland. The present number of Northern Ireland seats was set after a *speaker's conference* (special commission) in 1978.

The prime minister advises the sovereign when to dissolve Parliament so that a general election can be

In an election, voters visit a polling station, *left,* and mark their vote on a ballot paper. When voting closes, the ballot papers are taken to the count, *above,* where the result is worked out.

held. A general election must be held at least every five years, or sooner if the government is defeated on an important matter in Parliament. When the sovereign dissolves Parliament, the lord chancellor orders the returning officer of each constituency to organize new elections. The returning officer publishes details of the election as a notice in public places.

Nominating the candidates. Any person who is a British subject and is more than 21 years old can stand for election to Parliament, unless he or she is disqualified. People disqualified from standing include members of the House of Lords who have not *renounced* (given up) their peerages, people convicted of serious crimes or of corruption during an election, and people employed by the state for a salary. Members of the armed forces must be *discharged* (released) before standing.

A person who decides to stand for Parliament must first be *nominated* (proposed for election). He or she must have *nomination papers* signed by at least 10 registered voters of the constituency in which he or she intends to stand. The candidate must then hand in the papers to the returning officer before a fixed *nomination day* and pay a *deposit* of £500. The deposit is returned only if the candidate receives at least 5 per cent of the votes cast. After nomination day, the returning officer publishes a list of candidates.

The election campaign. Most candidates in parliamentary elections are members of political parties. The parties help their candidates by providing publicity both nationally and locally. The national leaders of the parties make speeches and decide the parties' policies. In the constituency, the local branches of the parties have *campaign committees* to organize the local campaigns. The most important member of the campaign committee is the *election agent.* By law, the election agent's name must appear on all printed publicity material. This official must also keep accounts of all the money spent in the campaign. The amount is limited by law.

The local party organizes a *canvass* of voters. Party members call at the home of each voter to ask for his or her support. They distribute pamphlets, posters, and the candidate's *election address.* This leaflet generally includes a photograph of the candidate, details of his or her career, and a statement of his or her views and the party's policies. The candidate holds public meetings and visits people's homes.

On election day, everyone who is registered can vote. Only people who live in the constituency are entitled to register. After voting ceases, police officers take the ballot boxes to a central building, such as the town hall, for the count. The returning officer announces the result. By custom, the new MP and the other candidates then thank the returning officer and the staff for their work. They also thank their party workers.

Political parties

Political parties in Britain are of two kinds. Some parties aim to appeal to the public as a whole and have policies that cover the whole range of government. Other parties aim to appeal to a small section of the public and have limited policies.

The British Parliament has usually been dominated by two parties. One has formed the government and the other the main opposition. All parties not involved in government receive financial help from the government in order to meet parliamentary expenses.

Main parties. The two largest parties in Britain are the Conservative Party and the Labour Party. The other main party is the Liberal Democrats.

The Conservative Party has about 1 million members. The Conservative Party developed from the Tory Party, which began in the late 1600's. It has always been one of the two main parties in Britain. Since World War II (1939-1945), the Conservative Party has spent more time in government than in opposition.

The Labour Party obtains much of its support from trade unions. About 5 million trade union members are affiliated to the party. In addition, the Labour Party has more than 250,000 individual members. The Labour Party began in 1900. Between 1906 and 1921, it gradually replaced the Liberal Party as one of the two main parties. It has held government office five times.

The Liberal Democrats are the result of a merger between the Liberal Party and the Social Democratic Party (SDP). The Liberal Party developed from the Whigs, who emerged in the late 1600's. The Liberal Party lost much of its power after the 1920's. The Social Democratic Party was formed in 1981. After an initial surge of success, the SDP lost support. In 1988, the SDP merged with the Liberal Party to form the Liberal Democrats. A small group of SDP members refused to accept the merger. They continued as an independent party for two more years.

Minor parties often differ from the main parties by supporting more left-wing or more right-wing policies. Left-wing parties include the *Communist Party of Great Britain,* the *Workers' Revolutionary Party,* and the *Socialist Party of Great Britain.* The Communist Party is the largest of these parties. Right-wing parties include the *National Front* and the *British National Party.* Both parties favour fascism. During the 1980's, the *Green Party* grew quickly, campaigning on issues relating to the environment.

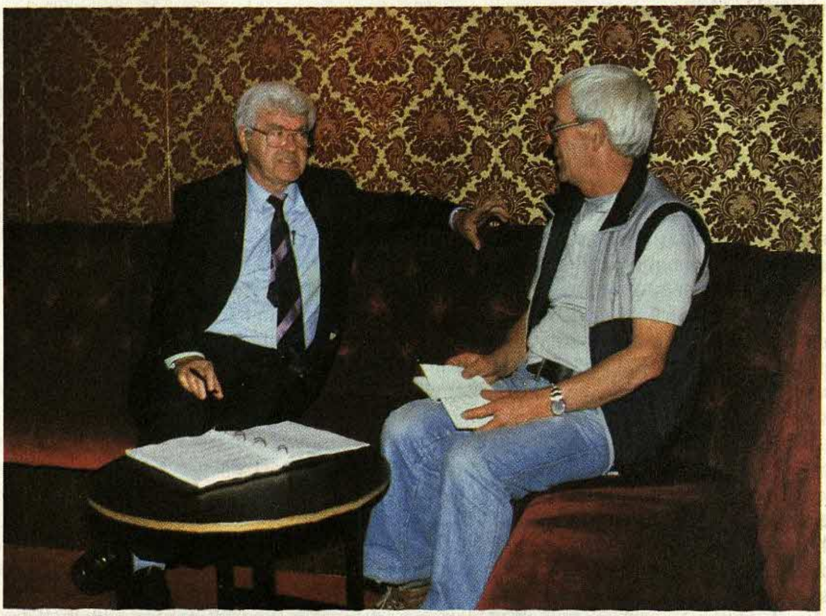
Other minor parties in Scotland, Wales, and Northern Ireland aim to secure more self-government for their countries. These parties include the *Scottish National Party* and *Plaid Cymru,* the Welsh Nationalist Party. Both parties regularly win seats in elections. Northern Ireland has several small parties with parliamentary representation. The *Unionist* parties believe in maintaining Northern Ireland's union with Britain. Another party is the *Social Democratic and Labour Party.*

Members of Parliament

Members of Parliament safeguard the interests of the people within their constituencies. They also work together for the good of the nation. Almost all members have a loyalty to a political party.

Once elected, an MP takes a seat in the House of Commons. MP's spend much time on bills introduced by the government. Some time is reserved for *private members*—MP's who are not ministers—to introduce bills.

MP's also debate the general conduct of affairs by the government. At the end of each day in the House of Commons, half an hour is set aside for MP's to raise some particular matter of administration that may be of general concern or that may affect a single individual. This period is known in the House of Commons as a *de-*



Members of Parliament hold regular informal *surgeries,* in which their constituents meet with them to discuss a political matter or particular concern. A *constituent* is a person who lives in the voting district represented by the member of Parliament.

bate on an adjournment motion. MP's must draw lots for the opportunity to use this half-hour and to introduce bills of their own. Some MP's are appointed to serve on select committees of the Commons.

No MP can be fully informed on all subjects. As a result, most members specialize in a few subjects. In the two major parties, MP's organize themselves into groups to study particular subjects.

MP's usually do not attend all the sittings of the House of Commons. Most members attend sittings of the Commons only for debates or questions in which they have a particular interest. But, if a vote is to be taken on some important issue raised in debate, all the MP's available to vote are assembled in the Commons by the party whips.

Sometimes illness, an important engagement, or a visit overseas may prevent an MP attending a debate. If the debate is to be put to a vote, the MP asks his or her whip to arrange a *pair.* The whip arranges with the whip of the opposite party to pair off the absent MP with an MP from the other party who will also be absent.

MP's are paid an annual salary. They may also claim the cost of travelling on parliamentary business and of secretarial help. Many members also earn money from professional occupations or from business activities. Some MP's receive grants from trade unions.

Most MP's visit their constituencies about once a fortnight so that people can consult them on such personal problems as housing, pensions, or income tax. Members often take up these matters with government departments or local authorities.

In theory, MP's cannot resign from Parliament. But, in practice, those who wish to leave Parliament do so by applying for the office of *steward of the Chiltern Hundreds* or of *steward of the Manor of Northstead.* These stewardships are paid offices in the gift of the Crown. Acceptance of them automatically disqualifies the holder from being an MP. Once members are out of Parliament they resign the stewardship. The House can refuse the stewardship to MP's who behave disgracefully, and it can vote to expel them.

MP's cannot sit in the Commons if they accept a peerage. MP's who inherit a peerage can renounce it to stay in the Commons. MP's give up their membership when Parliament is dissolved and a general election is held. They decide, after conferring with their local party, whether to stand for election to the next Parliament.

Prime minister

The prime minister is the head of government. He or she is almost always the leader of the majority party in the House of Commons. The monarch asks the prime minister, as majority leader, to form a government. The prime minister chooses the ministers for his or her government and decides which of them will be in the Cabinet. The Cabinet must agree on most government actions, but the prime minister alone has certain powers. These powers include dissolving Parliament and calling a general election. The prime minister, as the government's chief minister, is responsible for all the actions of the government and for the government's relations with Parliament.

The prime minister's official title is *prime minister and first lord of the Treasury.* The title *first lord of the Treasury* is the older part of the full title. The title *prime minister* has been used since 1721, but it was not officially recognized until the early 1900's. The prime minister's official home is at 10 Downing Street, near Parliament. Prime ministers also have the use of a country house called *Chequers,* in Buckinghamshire.

Advising the monarch. The prime minister's choice of members of the government has to be formally approved by the monarch. The prime minister is said to *advise* the monarch about these appointments and about other appointments made by the Crown, such as the choice of bishops for the Church of England and judges for the Supreme Court (the High Court and the Court of Appeal). He or she also has the power to submit to the monarch lists of people considered worthy of honours, such as peerages. The prime minister's power to select peers is important because it gives him or her influence over the choice of some new members of the House of Lords. In addition to these activities, the prime minister also advises the monarch about royal visits to other countries.

The prime minister has no regular *audiences* (meetings) with the monarch. But audiences are arranged, at either the monarch's or the prime minister's suggestion, whenever either wants to discuss matters of state.

Leading the government. The prime minister is the senior minister of the Cabinet. At Cabinet meetings, the prime minister tries to guide the other ministers to agreed decisions. Some prime ministers have regarded their role in the Cabinet as that of chairman. They summed up the discussion among the other ministers and then reached a conclusion. Other prime ministers have taken an active part in the discussion and then summed up the discussion as well.

Sometimes a problem arises in one government department that threatens to affect the popularity of the government as a whole. When such problems arise, the prime minister consults the minister in charge of the department concerned and helps solve the problem. For example, if a strike of dockers threatens the economy, the prime minister can suggest to the secretary of state for employment that his department should intervene to stop the strike. The prime minister may have to make peace between two ministers who are in dispute.

Much of a prime minister's time is spent in reading reports from government departments or from diplomats in other countries. The prime minister is not expected to know the affairs of each government department in great detail. But he or she is expected to have a broad knowledge of developments in each department. The prime minister is also expected to keep in close touch with Parliament. Some of Britain's prime ministers have assigned themselves control of a government department in addition to their work as prime minister. But, today, as government becomes increasingly complex, political experts consider that the prime minister should not do additional work. The prime minister's advisers, in addition to government ministers, include a staff of permanent government servants.

Representing the country. Constitutionally, the monarch, as Britain's head of state, is the only person who can represent the whole nation. But there are times when the prime minister, as head of the government, may be regarded as representing the nation also. For ex-

Prime ministers of Britain

Name	Party	Became PM
Sir Robert Walpole	Whig	1721
Earl of Wilmington	Whig	1742
Henry Pelham	Whig	1743
Duke of Newcastle	Whig	1754
Duke of Devonshire	Whig	1756
Duke of Newcastle	Whig	1757
Earl of Bute	Tory	1762
George Grenville	Whig	1763
Marquess of Rockingham	Whig	1765
William Pitt, Earl of Chatham	Whig	1766
Duke of Grafton	Whig	1768
Lord North	Tory	1770
Marquess of Rockingham	Whig	1782
Earl of Shelburne	Whig	1782
Duke of Portland	Coalition	1783
William Pitt, the Younger	Tory	1783
Henry Addington	Tory	1801
William Pitt, the Younger	Tory	1804
Lord Grenville	Whig	1806
Duke of Portland	Tory	1807
Spencer Perceval	Tory	1809
Earl of Liverpool	Tory	1812
George Canning	Tory	1827
Viscount Goderich	Tory	1827
Duke of Wellington	Tory	1828
Earl Grey	Whig	1830
Viscount Melbourne	Whig	1834
Duke of Wellington	Tory	1834
Sir Robert Peel	Tory	1834
Viscount Melbourne	Whig	1835
Sir Robert Peel	Tory	1841
Lord John Russell	Whig	1846
Earl of Derby	Tory	1852
Earl of Aberdeen	Peelite	1852
Viscount Palmerston	Liberal	1855
Earl of Derby	Conservative	1858
Viscount Palmerston	Liberal	1859
Earl Russell (formerly **Lord John Russell**)	Liberal	1865
Earl of Derby	Conservative	1866
Benjamin Disraeli	Conservative	1868
W. E. Gladstone	Liberal	1868
Benjamin Disraeli	Conservative	1874
W. E. Gladstone	Liberal	1880
Marquess of Salisbury	Conservative	1885
W. E. Gladstone	Liberal	1886
Marquess of Salisbury	Conservative	1886
W. E. Gladstone	Liberal	1892
Earl of Rosebery	Liberal	1894
Marquess of Salisbury	Conservative	1895
A. J. Balfour	Conservative	1902
Sir Henry Campbell-Bannerman	Liberal	1905
H. H. Asquith	Liberal	1908
H. H. Asquith	Coalition	1915
David Lloyd George	Coalition	1916
Andrew Bonar Law	Conservative	1922
Stanley Baldwin	Conservative	1923
Ramsay MacDonald	Labour	1924
Stanley Baldwin	Conservative	1924
Ramsay MacDonald	Labour	1929
Ramsay MacDonald	Coalition	1931
Stanley Baldwin	Coalition	1935
Neville Chamberlain	Coalition	1937
Winston S. Churchill	Coalition	1940
Winston S. Churchill	Conservative	1945
Clement Attlee	Labour	1945
Winston S. Churchill	Conservative	1951
Sir Anthony Eden	Conservative	1955
Harold Macmillan	Conservative	1957
Sir Alec Douglas-Home	Conservative	1963
Sir Harold Wilson	Labour	1964
Edward Heath	Conservative	1970
Sir Harold Wilson	Labour	1974
James Callaghan	Labour	1976
Margaret Thatcher	Conservative	1979
John Major	Conservative	1990

All prime ministers have a biography in *World Book*.

ample, the prime minister represents the country when making a formal visit to another country or when receiving a distinguished foreign guest.

When attending international conferences, the prime minister goes not only as leader of the government and leader of a party but also as leader of the nation.

Leading a party. Members of Parliament who are appointed prime minister are usually the leaders of their party. If they are not, their party selects them as its leader soon after their appointment as prime minister. For example, Winston Churchill was not the leader of his party when he became prime minister in 1940. The Conservatives elected him leader of the party several months later.

For several reasons, prime ministers can be removed from the leadership of their party only in exceptional circumstances. First, the kind of man or woman who becomes party leader generally has great personal authority. Such people are skilled at meeting criticism and checking opposition. Second, prime ministers usually receive warnings of opposition from within their party sufficiently early to take action to check it. They receive these warnings from the party whips. Third, members of the party that the prime minister leads are usually unwilling to admit to the country that he or she has proved a bad choice as leader. Fourth, a prime minister may act to prevent some party members from criticizing the conduct of affairs by appointing them to ministerial posts. Fifth, members of the majority party know that, if they reject the leadership of the prime minister, he or she can then call a general election, in which some of the critics may lose their seats.

But, in extreme cases, the majority of Parliament can remove the prime minister from the leadership of the party and from the office of prime minister. For example, in May 1940, in the early part of World War II, Conservative Party members of Parliament forced Neville Chamberlain to resign as prime minister and party leader because of his weak war leadership.

The Cabinet

The Cabinet is the group of senior ministers responsible for the general policy of the government. The Cabinet watches over the general conduct of the government and decides what steps will be taken to deal with matters of government. The Cabinet decides what new laws and amendments to existing laws will be introduced to Parliament.

The structure of the Cabinet. The prime minister is the senior minister in the Cabinet. He or she has the power to appoint the ministers of the government and to ask for their resignations. The prime minister chooses about 20 ministers to form the Cabinet. These are usually chosen from among the group of ministers each appointed as head of one of the various departments of government.

Ministers who are in charge of the most important government departments are always included in the Cabinet. These departments include the Treasury, the Home Office, the Foreign and Commonwealth Office, the Department of Health, and the Ministry of Defence.

A senior civil servant holds the post of secretary to the Cabinet. The secretary and a group of assistants comprise the *Cabinet Office,* the staff that records the discussions and decisions of the Cabinet. This staff also prepares the *agenda* (list of business) to be discussed at Cabinet meetings. Cabinet meetings are often attended by officials who are not members of the Cabinet, such as other government ministers or the chiefs of the army, navy, and air force. All ministers must swear on oath that they will not reveal details of confidential government business.

Cabinet ministers try to reach total agreement on each matter they discuss at their meetings. After the ministers have discussed a particular matter, the prime minister sums up the general view of the meeting. If there is no disagreement with this summing up, it is accepted as the official view of the Cabinet. Occasionally, if members of the Cabinet are divided in their opinions, the matter under discussion is put to a vote.

A minister who disagrees with a policy of the Cabinet and will not support it must resign. This resignation is necessary under a principle of government that is known as *collective responsibility.* Under this principle, the ministers are each responsible for the way their department functions. But the whole Cabinet supports one another and shares responsibility. Members of the Cabinet cannot support an individual minister unless he or she acts in accordance with the general policy of the Cabinet. As a result, when the Cabinet decides on a particular policy, each minister must support the policy even if he or she has argued against it and still does not agree with it.

The work of the Cabinet. The Cabinet is responsible for the general conduct of government affairs, and it sees that the country's laws are carried out. The Cabinet is also responsible for presenting proposed new laws and tax measures to Parliament. The Cabinet normally receives Parliament's consent to its proposals, because the Cabinet belongs to the majority party.

The Cabinet often appoints committees to consider particular matters of government. These committees consist of Cabinet ministers as well as ministers who are not in the Cabinet. The names of committee members and their deliberations are not made public, because the final responsibility for the decisions of Cabinet committees rests with the Cabinet. Cabinet committees are often used for talks on government projects that require the cooperation of several departments. For example, if the secretary of state for the environment decided to create a new town, he or she would need to consult other government departments, such as the Department of Trade and Industry. The department could work to encourage suitable industries to establish factories or offices in the planned new town.

One of the most important Cabinet committees is the committee on defence and overseas policy. It is a permanent committee, headed by the prime minister, that often meets with the nation's army, navy, and air force chiefs. Another important committee, the legislation committee, considers what proposed new laws should be submitted to Parliament.

How Parliament works

Making laws is Parliament's most important function. Most laws result from bills introduced by the government, but some time is reserved for backbenchers to introduce bills. The introduction of a bill is called its *first* *reading.* After a bill has been given a *second reading* (has been approved in principle), it is usually *sent upstairs.* This phrase means that the bill is passed to a *standing committee* of 16 to 50 members to be examined in detail.

Sometimes the bill is *kept on the floor.* This phrase means that the bill is kept in the House to be discussed in *Committee of the Whole House.*

When the House sits as a committee, proceedings are less formal than when it sits as a house. After the bill has been discussed and amended at committee stage, it goes back to the House for consideration, and it may be amended further. A final decision on the bill is taken at the *third reading,* often without debate. When a bill has gone through these stages in both Houses, it is ready for the royal assent.

Voting taxation to provide the government with income for its activities is another important function of Parliament. Proposals for changes in taxation are made by the *chancellor of the exchequer,* who is in charge of the Treasury. The chancellor describes taxation proposals in a *Budget* speech given to the Commons each spring. When the proposals have been agreed to in general, they are set out in detail as a *finance bill.* Budget proposals on tax increases usually come into force straight away. If Parliament rejects any increase during detailed discussion of a finance bill, that tax increase then ceases to take effect.

There is a special procedure for dealing with overall reviews of taxation and government spending. In consultation with the Treasury, ministers prepare detailed estimates of the money they will need for their departments during the coming year. The House sets aside 29 *supply days* in each session. Originally, these days were intended for the discussion of the estimates. But supply days are now used for general debates on the government's policy or on any other topic chosen by the opposition. The actual estimates are usually agreed to without discussion. A *Consolidated Fund Bill* is brought in to authorize the spending contained in the estimates. The estimates are then considered in detail by the *Estimates Committee.*

Questioning the government, to make sure that it is performing its duties honestly and efficiently, is another important function of Parliament. At *question time,* members may ask questions dealing with any matter for which ministers are responsible. In the Commons, question time occupies the first hour of business each day. Backbenchers from both the government and opposition parties may question ministers on matters relating to the ministers' own areas of responsibility. On Tuesdays and Thursdays, backbenchers and opposition leaders have an opportunity to question the prime minister on any subject.

Another opportunity that backbenchers have to question the conduct of the government or criticize the actions of a government department is the adjournment debate. (For an explanation of this procedure, see the section *Members of Parliament* earlier in this article.) A backbencher who wins the chance to speak in the adjournment debate is said to *have the adjournment,* because nominally he or she is speaking to the motion that "This house do now adjourn."

The days on which the House adjourns before the holidays are also reserved for backbenchers. In an emergency, the speaker may allow an adjournment motion to be moved after question time. This procedure can be used to request a debate on a subject of the proposer's choice. If the members support the adjournment motion, a three-hour debate is then held on the subject, usually on the following day.

Committees. Much of the House's work is done in committees which meet in the mornings and the afternoons. In addition to standing committees, the Commons has many *select committees,* each of which considers a specific subject. The select committees hear evidence and publish reports that may be debated by the House.

The House of Commons is divided on either side of the speaker's chair. Government supporters sit on the speaker's right and opposition supporters sit on the left.

How a bill becomes law in Parliament

Origins of a bill. Ideas for new laws originate in many ways. Political parties adopt policies at party conferences. The government can introduce bills to give effect to the government party's policies. Sometimes, an individual minister persuades the government to introduce a particular bill. On other occasions, the government introduces a bill in response to public opinion or in response to a *lobby* (pressure group). Occasionally, following a large disaster or an event like a series of riots, the government appoints a commission of investigation. The government may respond to the commission's recommendations by introducing a bill.

First reading. The speaker calls upon the minister or private member who is sponsoring the bill. The sponsor rises and bows. The clerk of the House then reads out the title of the bill, and a date is fixed for the bill's next parliamentary stage, the second reading. In this procedure for the first reading, members do not debate the bill.

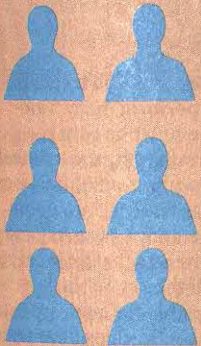
The report stage. When a committee has examined a bill, it makes its report to the House. The House then debates the bill as reported. The committee's amendments may be accepted or rejected, and further amendments may be made. Bills that have been considered and amended by a Committee of the Whole House go straight to the third reading.

The third reading. The third reading is similar to the second reading but for many bills is not debated. Members must not propose substantial amendments. At the end of the third reading, the members vote on the bill. If they approve it, the bill is sent to the House of Lords, to go through a similar process.

Completion of consideration. To become law, a bill must receive three readings in each House. Amendments made by one House have to be approved by the other. If the two Houses cannot agree on a bill, the bill must be dropped. But if the House of Commons passes the same bill again in the next session, the bill goes for the royal assent and becomes law without the approval of the House of Lords.

Between the first and second readings, the bill is printed and circulated to all members.

The second reading. On the arranged date, the bill's sponsor rises and moves "that the bill be now read a second time." The sponsor then makes the main speech in favour of the bill. An opponent of the bill, usually a member of the main opposition party, then makes a speech opposing the bill. A general debate follows. A second-reading debate is confined to the general principles of the bill. Members may not propose amendments of detail. After the debate, the members vote on the sponsor's motion. If the motion is carried, the bill is said to have been read a second time, and it goes forward to be examined in detail.



The committee stage. Each bill is considered in committee, where members discuss each clause of the bill. They must either accept, amend, or reject every clause. In the committee stage, the opposition has the chance to remove objectionable details of the bill. But the opposition may not propose amendments that would destroy the bill's main purpose.

Standing committees consider most bills at committee stage. Each standing committee contains between 16 and 50 members. The political parties are represented on each committee in the same proportion as they are in the Commons.

Committee of the Whole House. Some bills are discussed at the committee stage by all the members. These bills include ones authorizing government expenditure, bills of great constitutional or public importance, and bills not needing detailed discussion. When the House goes into Committee of the Whole House, the speaker leaves the chair, and the chairman of Ways and Means presides. Proceedings are less formal than when the House proper is sitting. To symbolize that the Committee of the Whole House is sitting, the mace is put under the table.

The royal assent is the formal agreement of the monarch to a bill. Normally, the royal assent is indicated by an announcement in each House, and the bill then becomes part of the law of the land.

Parliament's calendar begins early in November when the monarch opens a new session. The monarch addresses both Houses in the chamber of the House of Lords. The monarch's speech is prepared by the Cabinet. It outlines the business that the government proposes to bring before Parliament.

After the monarch's speech, the Houses separate, and each House proposes a motion thanking the monarch for the speech. The opposition proposes amendments to this motion regretting that the speech does not deal with various issues favoured by members of the opposition party.

In this way, the *Debate on the Address,* which lasts from four to five days, becomes a general debate on the policy of the government and the state of the nation. After the Debate on the Address, both Houses proceed to the business of making laws.

The government tries to get some important bills through the second reading before Christmas. In spring and summer, the Houses deal with the Budget and the finance bill. They also consider, and give a third reading to, bills that have passed the committee stage.

Usually, the Houses reassemble in late October and conclude the session's business. The monarch then prorogues Parliament and in the next week opens the new session.

The Commons' timetable. Most of Parliament's business is done from Monday to Thursday. Friday sittings are short, and Parliament sits on Saturday and Sunday only in an emergency. From Monday to Thursday, the mornings are reserved for the standing committees to deal with bills. The Commons assembles at 2.30 in the afternoon.

After a short service conducted by the speaker's chaplain, there are questions until 3.30. Members question the prime minister from 3.15 to 3.30 on Tuesday and Thursday afternoons. At 3.30, a backbencher may introduce a bill under the *Ten-Minute Rule.* The member makes a short speech, to which there may be another in reply. If the Commons approves, the member's bill is introduced and is ready for the second reading.

The main business of the Commons begins at about 3.40 p.m. Sometimes the Commons considers a bill. Sometimes the speaker leaves the chair, and the Commons becomes the Committee on Supply or the Committee on Ways and Means.

Under the *10 o'clock rule,* business normally comes to an end at 10 p.m., but the Commons may sit longer if the majority wish to.

Many acts of Parliament give ministers power to make orders on matters of detail. These orders, called *statutory instruments,* are debated after the main business of the day. The last business of the day is a half-hour adjournment motion.

On Fridays, the Commons meets at 11 a.m. and does not take questions. Twenty Fridays are reserved for bills and motions promoted by backbenchers, who draw lots for the available time. The adjournment motion concluding business comes at 4 p.m.

Recording of Parliament. All Parliamentary debates are published in *Hansard,* the official *verbatim* (word-for-word) report. Some sittings of Parliament are broadcast live by radio or television. Televising of proceedings in the House of Lords began officially in May 1986, following a period of experimental transmissions. The first televised sitting of the House of Commons was on Nov. 21, 1989. Members of the public may attend nearly all sittings of the Commons and Lords.

Government departments

Government departments in Britain carry out the policies of their respective governments. Each department is responsible for administering one or more of the many activities in which the governments are involved. Money to finance the work of government departments is provided through the Treasury. It is the duty of all government departments to carry out the policies of their respective governments and to recommend suitable changes in the law.

Government departments are run by a permanent staff of civil servants. A senior civil servant, the *permanent secretary,* heads the department. He or she is responsible to a government minister and advises the minister on a variety of matters relating to the department. The minister is answerable to Parliament for the department's work.

Every department has its own minister. In Britain, the minister may be called a secretary of state or may have a traditional title. For example, the minister in charge of the Treasury is called the chancellor of the exchequer. A minister in Britain is a member either of the House of Commons or, more rarely, of the House of Lords.

Local government

Local government authorities are created by act of Parliament. The local authorities perform many functions relating to their areas. Some functions are required by law and others are permitted by the national government. If a local authority requires additional powers, it may seek a private act of Parliament. Parliament can pass laws requiring all local authorities to fulfil new functions. It can also pass *adoptive* acts that let local authorities take up certain powers if they so wish.

National government is responsible for such areas as income tax and defence. But local authorities have wide powers in certain other areas. These include control of advertising, housing, public health, recreation, roads, schools, and many aspects of town and country planning. The work of local authorities is concerned with meeting immediate needs within their own areas.

Elected councillors control most of the local government. They are unpaid. Paid officials act on decisions made by the councillors, decisions that reflect laws and policies of the national government.

Authorities. Three separate systems of local authorities exist within the United Kingdom. These systems were introduced under local government reorganization in the 1970's.

In England and Wales, under the Local Government Act of 1972, the most powerful authorities are *county councils.* The areas covered by the county councils are divided into *districts.* These districts come under the control of *district councils.* There are 47 county councils in England and Wales and 369 district councils. The districts are in turn divided into smaller areas controlled by *parish councils* in England and by *community councils* in Wales.

The six counties of Ulster making up Northern Ireland

Local government councils meet regularly to discuss and act on issues important to their districts. They generally hold these meetings in special chambers, such as Cardiff City Hall, *left.*

ceased to be administrative units under the reorganization of April 1973. As a result, the only local authorities in Northern Ireland are its 26 district councils.

In Scotland, the top-level authorities are the nine *regional councils* and the three *islands councils.* The Scottish regions and islands areas are similar to the counties of England and Wales but generally larger in extent. The nine Scottish regions are divided into a total of 53 districts, governed by district councils. The islands, although equal in status to the regions, are not subdivided. This system of regional and islands councils replaced the older Scottish counties and *burghs* (towns) in 1975.

County councils in England and Wales and regional and islands councils in Scotland administer such matters as civil defence, schools (including career advisory services), firefighting services, highways, libraries and museums, parks, police, public baths, public health, refuse disposal, social services and welfare, and town and country planning.

In the 1972 reorganization of England and Wales's local government, six counties were defined as *metropolitan counties.* These were based on heavily built-up areas and had similar duties to the Greater London Council (GLC), set up in 1965. The metropolitan counties and the GLC had duties similar to other county councils, but in addition they also had to run the public transport system. In 1986, by act of Parliament, the GLC and metropolitan counties were abolished. Outside London, the duties of the metropolitan councils mostly passed to the district councils. For full information on the present nature of London's local government, see **London.**

District councils outside the areas of the former metropolitan county councils provide a range of services including cemeteries, local museums and art galleries, local planning, parks and open spaces, playing fields, public transport, refuse collection, and swimming baths. Much of what districts provide must fit in with the policies of the county or region. District councils outside Northern Ireland also provide housing. In Northern Ireland, this provision is made by the Northern Ireland Housing Executive.

Parish and community councils have few powers. They may undertake street lighting and paving, maintain public footpaths, and provide local playgrounds.

Elections. A voter in a local election must be 18 years old or more and must be resident in the voting area. Candidates for election as local government councillors must be more than 21 years old and must be British citizens. Local authority employees, undischarged bankrupts, and certain types of former criminal may not stand for election. Many candidates belong to a major political party and represent its policies.

Most councillors are elected on a first-past-the-post system. But in Northern Ireland, a form of *proportional representation* is used (see **Proportional Representation**). County and regional councillors serve four-year terms, as do district councillors. All the county and regional councillors are elected at one time. Elections are held for one-third of the district councillors in each of the three years when county and regional council elections are not held.

Finances are obtained from three main sources—from the revenue support grant provided by the national government; from local taxes, such as business rates or the council tax; and from rents on municipally owned property. Local authorities generally borrow money for large items of capital expenditure. They may borrow from the national government, or from the public by issuing municipal bonds.

In 1989, the government changed the basis for raising local taxes. They abolished the domestic *rates*—the old system of taxing people according to the *rateable value* (the theoretical rentable value) of the land and buildings they occupy. They replaced the rates with the *Community Charge.* This was a fixed sum, decided by each local authority and payable by every adult in the local authority's area. In 1990, a *national uniform business rate* was imposed on business premises in England and Wales. Under this system, all businesses pay the same proportion of their property's rateable value.

The Community Charge, also known as the *poll tax,* was unpopular when it was introduced in Scotland in 1989 and in England and Wales in 1990. One reason was that most people within a local authority area had to pay the same community charge, whether their income was high or low. Another reason was that some local authorities set considerably higher poll taxes than other local authorities.

In 1991, the government announced its intention to replace the community charge with a council tax, to be introduced in 1993. The council tax is linked to property values through a system of broad bands. People are assigned a band according to the market value of their homes. Under the council tax, each household receives a single bill. For households of two or more adults, the full bill is normally payable; single-adult households receive a 25 per cent discount.

History

In the 1100's, the theory of English government was that all power lay with the king. But it was held that this power should be exercised in accordance with custom and with the advice of the *great council* of churchmen and landowners.

In 1258, the council complained to King Henry III that he never consulted it, except when he needed money. It demanded that *parliaments* (discussions) should be held three times a year. When the king rejected this idea, Simon de Montfort led a rebellion. He defeated the king at the Battle of Lewes (1265). He then called a parliament, summoning not only the members of the council, but also representatives of the communities or *communes* (the counties, cities, and towns). De Montfort was killed shortly afterwards at the Battle of Evesham. But, from then on, the *commons* were more and more frequently called to be a part of a parliament.

However, real power remained with the great nobles and their private armies until the end of the Wars of the Roses in 1485. In that year, Henry Tudor became king, bringing stability. Under the Tudors, Parliament's power began to grow.

The financial difficulties of the Stuart kings led to conflicts with Parliament that resulted in the Civil War and the temporary overthrow of the monarchy by Oliver Cromwell. The struggle between king and Parliament was finally resolved when Parliament rejected James II and offered the Crown to William III in 1688. From that time onwards, it was established in law that final power lay with Parliament.

The 1700's. George I could speak no English when he became ruler of Britain in 1714. Unlike previous mon-

Local authorities in the United Kingdom provide a range of public services to the communities they govern. Refuse collection from homes and businesses, *above,* is the responsibility of district councils. County councils generally administer local fire services, *right.*

David Lloyd George was prime minister during the last part of World War I, and helped to draft the peace treaty.

archs, he did not preside at meetings of the cabinet. The minister who took his place was called the *prime* (first) *minister.* But the title *prime minister* did not become official until the early 1900's.

George III, who became king in 1760, partly succeeded in restoring to the monarchy several powers of government that George I had lost to the prime minister. But William Pitt the Younger, who was prime minister from 1783 to 1801, developed the post into one of great influence.

The 1800's. The growth of industry and population produced a demand for electoral reforms. In the early 1800's, many new industrial towns had no representation in Parliament. Other places with little population had several members of Parliament. These places were known as *rotten boroughs.* The 1832 Reform Act abolished many rotten boroughs and gave their seats in Parliament to the new towns. Also, more people received the vote. Later acts extended the vote, and the Ballot Act of 1872 introduced secret voting.

The extension of the right to vote, during the 1800's, increased the number of people who were interested in the work of the government, and prime ministers began to speak more directly to the people and less exclusively to Parliament. Benjamin Disraeli and William Gladstone twice succeeded each other as prime minister in the late 1800's. The rivalry between these men captured the imagination of the people, whose support for Gladstone gave him great authority within the Liberal Party.

The 1900's. Electoral reform continued with women over 30 receiving the vote in 1918. From 1928, voting was universal for everyone over 21. Acts of 1944 and 1949 redistributed seats in the Commons more fairly and set up Boundary Commissions. In 1969, the government extended voting rights to everyone over 18.

In the 1900's, the office of prime minister also increased in importance. World Wars I and II strengthened the position of the prime minister because of the frequent need for rapid action, after a minimum of discussion, by the head of the government. David Lloyd George and Winston Churchill were powerful prime ministers of these years. In the mid-1900's, means of mass communication, such as radio, television, and the national press, brought the prime minister closer to the people. The first woman prime minister was Margaret Thatcher, whose strong leadership between 1979 and 1990 profoundly affected British society.

Related articles in *World Book* include:

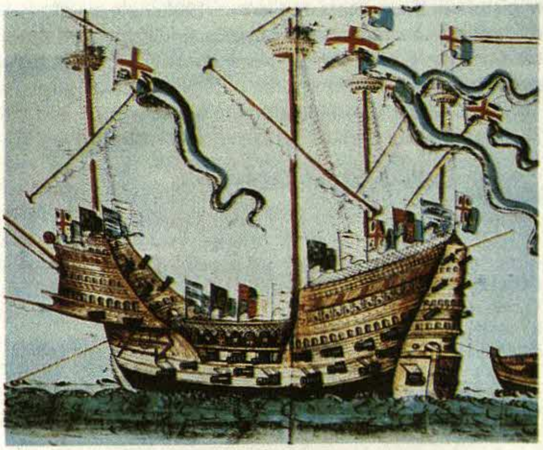
Black Rod
British Constitution
Cabinet
Conservative Party
Council
Crown, The
Election
Government
Hansard
Labour Party
Left wing
Liberal Democrats
Local government
Lord chancellor
Monarchy
Parliament
Parliamentary procedure
Peer of the realm
Political parties
Poll tax
Prime minister
Privy Council
Right wing
Sergeant at arms
Social Democratic and Labour Party
Speaker
Stormont Parliament
Tory Party
Union, Acts of
Unionist parties
Whig Party
White paper

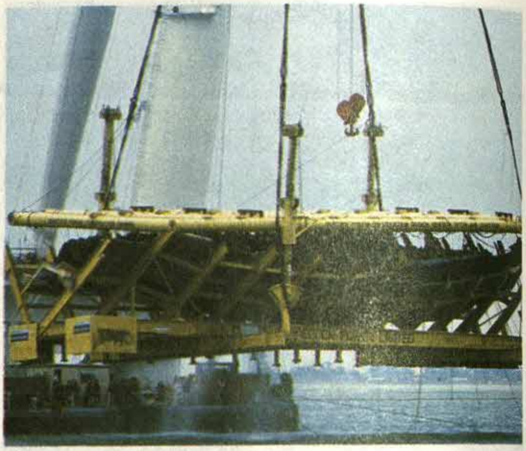
Outline

I. Parliament
  A. The supremacy of Parliament
  B. The monarch
  C. The House of Lords
  D. The House of Commons
II. Government and opposition
  A. The government
  B. Her (or His) Majesty's opposition
III. Elections
  A. The vote
  B. Parliamentary elections
IV. Political parties
  A. Main parties
  B. Minor parties
V. Members of Parliament
VI. Prime minister
  A. Advising the monarch
  B. Leading the government
  C. Representing the country
  D. Leading a party
VII. The Cabinet
  A. The structure of the Cabinet
  B. The work of the Cabinet
VIII. How Parliament works
  A. Making laws
  B. Voting taxation
  C. Questioning the government
  D. Committees
  E. Parliament's calendar
  F. The Commons' timetable
  G. Recording of Parliament
IX. Government departments
X. Local government
  A. Authorities
  B. Elections
  C. Finances
XI. History

Questions

What is the only legal limit on the power of Parliament?
What does "to prorogue Parliament" mean? Who prorogues Parliament?
Who presides over the House of Lords?
What type of bills does the House of Lords have no control over?
What is a parliamentary whip?
What does voting by *proxy* mean?
How many constituencies does the United Kingdom have?
What is discussed during a debate on an adjournment motion in the House of Commons?
How can an MP resign from Parliament?
Where is the official home of the prime minister?





Mary Rose is an example of growth in knowledge of British history. The ship was pictured in a list made for King Henry VIII's navy, *above left.* Exciting new historical details were discovered in 1982 when the ship was raised, *above right,* from where it had sunk in 1545.

History of the United Kingdom

History of the United Kingdom is part of the long story of all the peoples who have at one time or another lived in the lands that make up present-day England, Scotland, Wales, and Northern Ireland.

The term *United Kingdom of Great Britain and Northern Ireland* refers to England, Scotland, and Wales, together with Northern Ireland. The name *Britain,* or *Great Britain,* and the word *British* properly belong only to the political unit formed in 1707 by England, Scotland, and Wales. In 1801, the United Kingdom was formed, and at first it included the whole of Ireland. Many people use the term Britain as an informal name for the United Kingdom.

This article describes the evolution of the United Kingdom (UK) with reference mainly to the events of English and Welsh history. But it mentions events elsewhere where they are relevant. For further details on the history of Northern Ireland, see **Ireland, History of.** For more on Scottish history, see **Scotland, History of.**

Over the centuries, Britain has developed its civilization from a blend of different cultures. Prehistoric peoples, Celts, Romans, Angles, Saxons, Vikings, and Normans have all helped to shape the history of Britain.

From the 1500's onwards, Britain made rapid economic, cultural, political, and social progress and became a nation of world importance. The British people developed democratic parliamentary government and pioneered the technological advances of the Industrial Revolution. In the late 1900's, Britain was still among the world's leading industrial nations.

From 1500 to 1900, Britain developed the largest and most influential overseas empire in history. British civilization, laws, and culture helped in the shaping of Australia, Canada, India, New Zealand, the United States, the West Indies, and all the countries that now form the Commonwealth of Nations. In the 1900's, Britain gave up most of its empire and helped many countries to achieve political independence. Even though Britain's world influence has declined, the Commonwealth lives on as a group of nations linked by the legacies of that influence. Many of Britain's current citizens were born in Commonwealth countries or are descended from people born in such countries. These citizens are now making their own contributions to the story of Britain.

Prehistoric Britain

Britain's recorded history began with the Roman leader Julius Caesar's expedition of 55 B.C. But the story of human activity in Britain goes back hundreds of thousands of years before that date. Knowledge of this prehistoric period in Britain depends on the fossils, tools, monuments, and other remains that archaeologists have discovered and studied.

The earliest times. A million years ago, the whole of northwestern Europe, including Britain, was in the grip of the last Ice Age. During this period, the ice advanced and retreated several times across the land. Britain was joined to Europe by a land bridge.

During each *glaciation* (southerly advance of the ice), bitterly cold weather made Britain habitable for only the hardiest animals, such as cave lions, mammoths, reindeer, woolly rhinoceroses, and wolves. But during the *interglacials* (periods when the ice retreated northwards), the climate became warmer. This allowed areas of birch, pine, oak, and alder trees to flourish amid open grasslands and swamps. In these warmer periods, herds of *aurochs* (wild oxen), bison, deer, elephants, horses, and hippopotamuses roamed the country and were preyed on by bears, hyenas, and lions.

The Palaeolithic Period. Archaeologists think that the earliest *hominids* (ancestors of modern human beings) may have entered Britain overland from Europe more than half a million years ago. These hominids belonged to the *Palaeolithic Period* (Old Stone Age). They used stone tools and may have discovered how to control fire. They travelled as hunters, following herds of migrating wild animals. The earliest known settlements in Britain date from about 250,000 B.C. They include a site at Clacton, Essex, where stone choppers have been found. Each chopper was broken off a core of flint and then retouched. At Clacton, archaeologists also discovered a spearhead made of yew, the oldest wooden tool ever found. Other sites have yielded hand axes. One site, Swanscombe, in Kent, also produced the earliest hominid fossil found in Britain, the skull of a young female unearthed in parts in 1935 and 1936 and in 1957. The Swanscombe skull dates from about 200,000 B.C.

As the Palaeolithic Period progressed, hominids learned to use flake tools. These were axes, blades, scrapers, and pointed weapons made by preparing the tool on a core of flint before removing it from the core.

About 70,000 BC, the last of the severe glaciations began, and for much of this period, no hominids lived in Britain. Those who did venture into Britain during short mild spells dwelt in caves. These hominids included the earliest modern human beings.

Among the celebrated discoveries of the late Palaeolithic Period is the *Red Lady* of Paviland—a skeleton covered in red ochre. It was found in the Goat's Hole cave at Paviland, on the Gower coast of West Glamorgan, Wales, in 1823. It is not the skeleton of a Romano-British woman, as was first thought, but of a young man who died 25,000 years ago. His body had been smeared with red ochre, perhaps as part of a burial ritual.

About 12,000 B.C., the last Ice Age was ending, and the climate had begun to improve. People still dwelt in caves and hunted for food. Cheddar in Somerset and Creswell Crags in Derbyshire have produced many interesting finds from this period. These finds include Britain's only surviving works of Palaeolithic art. One such find, the *Dancing Man* of Creswell Crags, is a puzzling engraving on a piece of bone. It is said to resemble a masked male dancer. Another piece of bone from Creswell Crags is engraved with a horse's head.

The Mesolithic Period. By about 8000 B.C., Britain at last emerged from the Ice Age. Over the next 5,000 years, the improving climate changed the environment. Forests of oak, mixed with hazel and some pine trees, grew up. Lions, elephants, mammoths, and hippopotamuses were by then extinct in Britain. Such animals as beavers, elks, foxes, pigs, pine martens, polecats, red deer, and squirrels were common. Britain's rivers teemed with fish.

The slowly rising temperature caused the ice sheets to melt and raised the level of the sea. Britain lost its land link with the rest of Europe after the formation of the English Channel and the North Sea about 5000 B.C.

Britain attracted new settlers during this period. They hunted and fished, and their culture was more advanced than that of the Palaeolithic Period. Archaeologists call these settlers *Mesolithic* (Middle Stone Age) people. One group of these settlers migrated from Denmark not long after 8000 B.C. Their most famous remains are at a settlement at Star Carr, North Yorkshire.

Mesolithic people made such tools as saws and mattocks by gluing small, finely worked pieces of flint called *microliths* onto antler, bone, or wood with tree resin. Antler harpoons made in this manner were used for fishing. Mesolithic hunters domesticated the dog The people of this time also cleared a few areas of forest by fire, and some experts think they used the clearings for herding deer and other game.

The Neolithic Period. Shortly before 4000 B.C., scattered tribes of people travelled to Britain from the mainland of western Europe. These people brought the settled and highly organized culture of the *Neolithic* (New Stone Age) Period with them. They were mainly farmers and village traders. They cleared large areas of woodland and made fields for planting crops and farming livestock. They mined flint at such places as Grimes Graves, in Norfolk, and they produced superior stone axes. They imported items of jade and jet from Europe. They also made and traded in Britain's earliest pottery.

The Neolithic people appear to be the first in Britain to have put up buildings of stone and wood. They also built the first roads—wooden trackways across marshy areas such as the Somerset Levels—as well as vast enclosed areas called *causewayed camps* and *henges.* These areas were surrounded by interrupted ditches and may have been used as meeting places or markets. Neolithic communities probably consisted of villages ruled by local chiefs.

Neolithic people buried their dead in *long barrows* (long mounds) made of earth. Later, around 3000 B.C., they used communal chambered tombs or passage graves built of stone. These tombs belong to the class of huge monuments of stone called *megaliths.* Megalithic monuments also include vast circles of standing stones. The best known of these, Stonehenge, in Wiltshire, was probably begun about 2700 B.C. and completed by Bronze Age builders. Many experts believe Stonehenge shows that Neolithic and Bronze Age people had an advanced knowledge of mathematics and astronomy.

The Bronze Age. Between 3000 B.C. and 2500 B.C., people began using metal in Britain. New immigrants arrived in the country. One group came from the Rhineland and the Netherlands and mixed with another from Spain and Portugal. The newcomers were skilled in the use of copper and gold. Unlike the slim, long-headed people of Neolithic Britain, they were stocky and round-headed. Archaeologists refer to the new settlers as the

Stonehenge is a huge stone monument in southern England. It took hundreds of years to complete, after building work started about 5,000 years ago.

Beaker Folk, because of the distinctive beaker-shaped pottery vessels they buried with their dead.

The Beaker Folk were farmers who bred cattle and probably tamed horses. They also traded in gold and copper ornaments and made improved arrowheads of flint or copper, as well as copper daggers and axes. The Beaker Folk tended to live in isolated round houses, not in villages. They usually buried their dead singly under round barrows.

People started using *bronze* (copper hardened with tin) about 2000 B.C. Bronze tools and weapons gradually replaced those of flint and copper. Ornaments of gold and bronze became important luxury goods. Southern Britain took a major part in the trade in these items between Europe and Ireland, which was famous for bronze production. Early Bronze Age people buried their dead in round barrows with many luxury goods, but later they *cremated* (burned) their corpses and placed the ashes in pottery urns. By about 1400 B.C., Bronze Age people had completed Stonehenge and had built a larger monument at Avebury, in Wiltshire. They also built stone circles in many other places.

Archaeologists know little of life in the Bronze Age, but many experts think that the use of the wheel and the plough began in Britain during this period. Some scholars believe that certain classes of wealthy people ruled as an aristocracy. The people of the late Bronze Age made and used stabbing swords and shields of wood, leather, and bronze.

The Iron Age. As the Bronze Age ended, new groups of immigrants entered Britain. The new immigrants belonged to several different groups, but all used a form of the same language, called *Celtic.* These newcomers are therefore called *Celts.*

Some historians believe that the Celtic language had already spread to Britain earlier in the Bronze Age, perhaps as a result of trade with Europe. By the time the Romans reached Britain, in 55 B.C., Celtic had replaced Britain's earlier language almost entirely. Celtic was the ancestor of Gaelic, Irish, Cornish, Manx, and Welsh.

After 700 B.C., further Celtic-speaking immigrants began to arrive, bringing with them the use of iron. They made iron tools and weapons of high technical quality. After the 200's B.C., more advanced Celtic invaders arrived. They brought tools, weapons, shields, and very artistic personal ornaments.

The Celtic peoples were warlike. Their communities were ruled by warrior chiefs. They were the first people in Britain to use chariots and to ride on horseback. They also used slingshots. The Celts built forts on hilltops and protected them with ditches and ramparts. They built wooden houses and cleared forests for cattle farming. Some villages, such as one at Glastonbury, Somerset, were sited in shallow lakes.

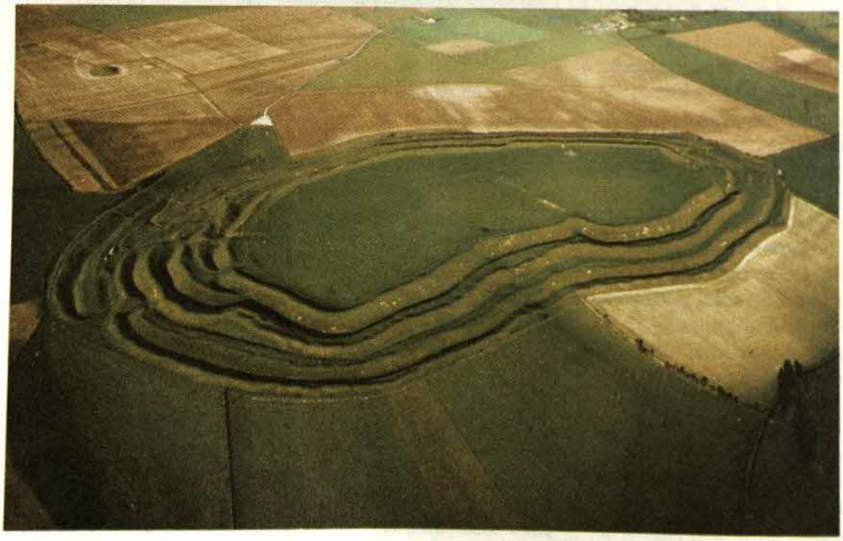
Some time after 100 B.C., the *Belgae,* the most advanced of the Celtic tribes, arrived in southern Britain from Gaul (France). They used ploughs, made pottery on potter's wheels, and struck metal coins. The Belgae exported slaves, dogs, iron, and tin to Gaul and other Mediterranean countries. They built farms and large settlements that developed into Britain's first towns.

First contact with Rome. By 56 B.C., the Roman general and political leader Gaius Julius Caesar had almost completed his conquest of Gaul. But Gallic resistance was hard to break and was being strengthened by help from Britain. *Druids* (influential Celtic priests based in Britain) were the main organizers of help for the Gauls. Caesar's chief aim in invading Britain was to destroy the druids. But he knew that further conquests would boost his popularity in Rome. Caesar led his first military expedition into Britain in 55 B.C. His personal account of this exploit marked the earliest direct written record of Britain's history.

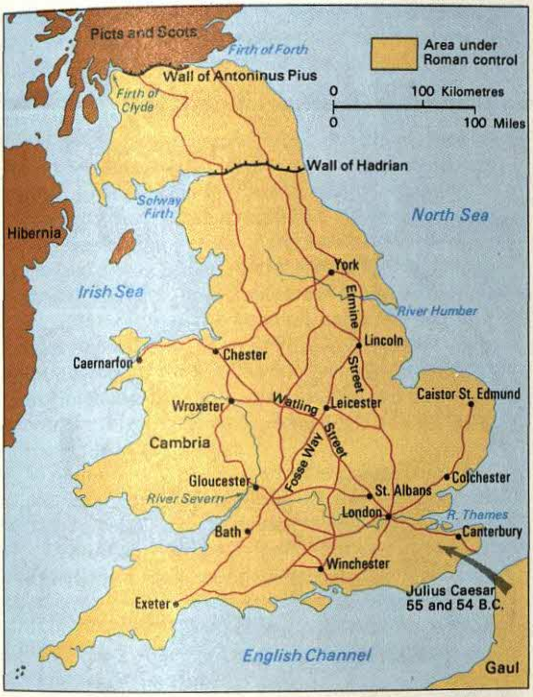
Roman Britain (55 B.C.-A.D. 410)

Caesar's expeditions. Julius Caesar led his forces into Britain in 55 B.C. and again in 54 B.C. On both occasions, he landed in Kent. In 54 B.C., he advanced inland and captured Wheathampstead, near present-day St. Albans, Hertfordshire. But a rebellion in Gaul forced him to withdraw from Britain.

At the time Caesar landed, Britain, which the Romans called *Britannia,* consisted of tribal communities ruled by kings or queens. The country's importance as a trad-



Maiden Castle was built in the Iron Age as a fortified village. It originally had a wooden *stockade* (fence) all round it as protection for the inhabitants. The earthworks can still be seen near Dorchester, in Dorset.



Roman Britain had a good network of roads connecting the major towns and forts. In the north, the walls of Hadrian and Antoninus Pius were built as defences against Picts and Scots.

ing centre was already well known but probably grew after Caesar's expeditions.

The Romans did not invade Britain again until nearly 100 years after Caesar's two expeditions. They then occupied the southern part of the island for more than 350 years. During this period, Britain was a province of Rome. It was ruled by Roman governors and defended by Roman armies and fleets.

The Romans built towns from which they administered occupied areas. London became the civil capital. Canterbury, Leicester, St. Albans, Winchester, and other towns became centres of regional Roman government. Colchester, Gloucester, Lincoln, and York developed as settlements for retired Roman soldiers.

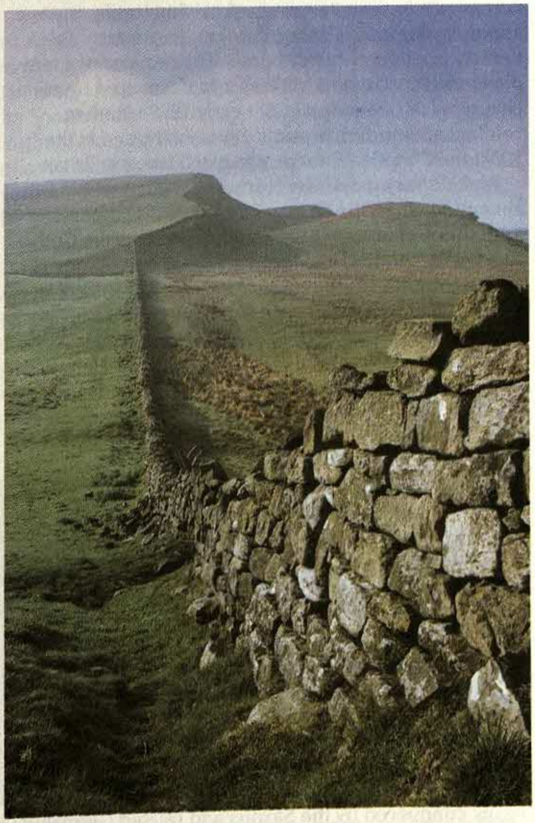
The arrival of the Romans. The Roman Emperor Claudius ordered the conquest of Britain in A.D. 43. At the Battle of the Medway, the Romans defeated the tribes of southeastern Britain led by Caratacus. Claudius himself marched in triumph into Colchester, where many tribal chiefs submitted to him. The Romans then advanced northwards and westwards from London, building roads and establishing forts. Caratacus fled to the southern part of present-day Wales. There, he headed a tribe called the *Silures* and resisted the Romans until A.D. 51, when he was defeated and captured. By A.D. 61, the Romans controlled the country as far north and west as the Humber and Severn rivers. In that year, Suetonius Paulinus, the Roman governor, defeated a rebellion led by Boudicca, queen of the Iceni of East Anglia. Historians in the Middle Ages spelt her name *Boadicea,* and this form is still common.

Important dates

55 B.C.	Julius Caesar sailed to Britain with a military force.
54 B.C.	Julius Caesar made a second invasion, but withdrew.
A.D. 43	Emperor Claudius began the Roman conquest of Britain.
61	Romans defeated the rebellion led by Queen Boudicca (Boadicea).
209	St. Alban, Britain's first Christian martyr, was killed.
368	Pictish tribes severely damaged Hadrian's Wall.
407	Few Roman soldiers remained in Britain.
410	British townspeople unsuccessfully appealed to Rome for protection.
446	Last, fruitless British appeal to Rome for protection was made.

Between A.D. 71 and 79, the Romans subdued western Britain. Gnaeus Agricola, appointed governor in A.D. 78, advanced northwards to the Firth of Forth and the Firth of Clyde. In the A.D. 120's, Emperor Hadrian built a wall from the Solway Firth to the River Tyne to defend Roman Britain from raids by the *Picts* and other tribes of northern Britain. From A.D. 140 to 142, during the reign of Emperor Antoninus Pius, Roman forces built a second defensive wall from the Firth of Forth to the Firth of Clyde, but they could not hold it against tribal attacks and eventually abandoned it.

The rule of the Romans. The Romans failed to conquer northern Britain and sent no expeditions to Hibernia (Ireland). Throughout Roman times, the mountainous districts of Cambria (now part of Wales) and the territory



Hadrian's Wall was built by the Romans in the A.D. 120's to serve as the northern defence line for Britain.

between Hadrian's Wall and the River Humber remained turbulent areas, controlled through forts and strategic roads.

Southern Britain, however, was considerably influenced by Roman civilization. There, the Roman way of life spread from the towns to the countryside. The Romans built most towns to a standardized pattern of straight, parallel main streets that crossed at right angles. The *forum* (market place) formed the centre of each town. Shops and such public buildings as the *basilica* (public hall), baths, law-courts, and temple surrounded the forum. The paved streets had drainage systems, and fresh water was piped to many buildings. Some towns had a theatre for animal fights, gladiator shows, and plays. Houses were built of wood or narrow bricks and had tiled roofs. In some houses, hot air from a furnace was conducted through brick pipes under the floor to provide heat.

Many Romans and wealthy Romanized Britons lived in country *villas.* Villas were long, single-storeyed farmhouses surrounded by estates with huts for slaves and peasants. The owner's house usually had about 12 rooms leading off an open veranda. Each villa was built around a courtyard. Many villas had baths. The main rooms had mosaic floors and walls with frescoes.

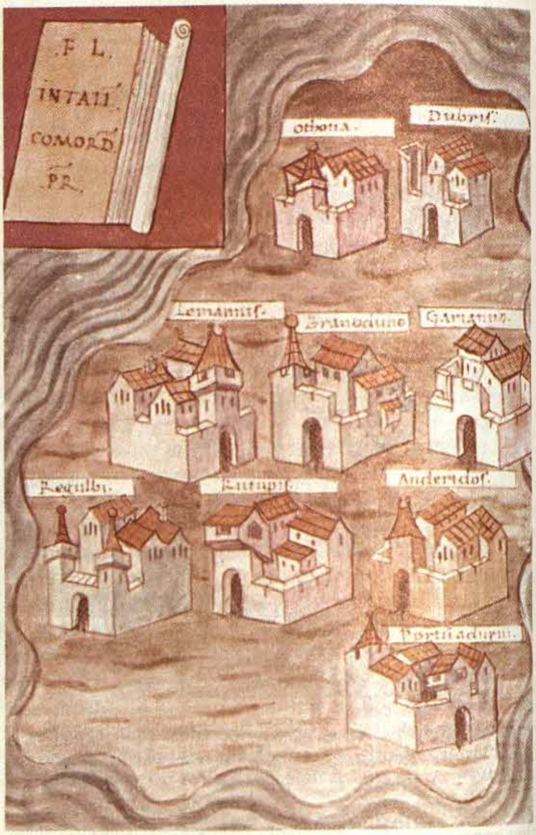
In the temples, priests offered sacrifices to such Roman gods and goddesses as Jupiter, Mars, and Venus. Priests also encouraged people to worship Roman emperors as gods. Emperor-worship was established in all Roman provinces as a means of gaining loyalty from conquered peoples. Some Romans, particularly soldiers, worshipped eastern gods. The remains of a temple to the Persian god Mithras was uncovered by archaeologists in London in the early 1950's. Roman soldiers and traders brought Christianity, and in the 300's, the Christian Church was established in Britain.

The departure of the Romans. Roman rule in Britain ended when the Roman Empire declined. Massive migrations of less civilized peoples, such as the Goths, Huns, and Vandals, had for years been putting pressure on the frontiers of Rome's provinces. In the 300's, Germanic tribes penetrated into Rome's western provinces. During the same period, *Saxon* pirates from Germany raided the southeastern coast of Britain. In 368, Pictish tribes severely damaged Hadrian's Wall and destroyed much of northern Roman Britain. A Roman army quickly restored order, but its control soon lapsed.

Roman forces withdrew steadily from Britain to Gaul and Italy. By 400, Hadrian's Wall and the forts of Cambria were abandoned. By 407, almost all the Roman soldiers had left Britain. In 410, people in the towns appealed to Rome for protection against the Saxons. But the Romans replied that Britain had to see to its own defence. Rome itself was being attacked by Goths.

One protective measure adopted by the desperate Britons in the 300's was the appointment of an official called the *Count of the Saxon Shore.* This person supervised the defence of the eastern coast of England, which was fortified by a series of forts from the Solent to the Wash. In the 400's, the fortifications were extended.

Despite their efforts, Romanized Britons were in time easily conquered by the Saxons and related Germanic tribes called *Angles* and *Jutes.* The Anglo-Saxons destroyed Roman culture wherever they settled. Consequently, the Roman occupation had few lasting effects on Britain, except for good roads in the southern part of the country and the survival of the Christian Church in Wales and Cornwall.



Defences against the Saxons were built in the A.D. 300's on the east coast of Britain. The map shown above is a medieval copy of a Roman map indicating the defences.

The Dark Ages (410-1066)

Many people today still call the period between the departure of the Romans in the 400's and the invasion of the Normans in 1066 the *Dark Ages.* This is because few reliable historical records of these times exist before the 800's, and our knowledge of them is therefore limited. The records that do survive often depend on legend and tradition.

For these reasons, the Dark Ages have been considered as a period of romantic mystery on the one hand and as a time of barbaric savagery on the other. Stories about King Arthur and his knights and about the magician Merlin are famous romantic tales of the period. They contrast with stories of Saxon battles and Viking raids. But most historians now believe that the Dark Ages were neither as cruel nor as romantic as people once thought. Modern researchers and archaeologists have discovered that many social, political, commercial, and international developments occurred during the period. The English nation began to emerge, and its people were converted to Christianity. The nation's first literature also was produced.

The Anglo-Saxon settlement. Romanized Celtic leaders operated the Roman system of local government until about 446, when they made a final, fruitless appeal to Rome for protection. From then onwards, power fell more and more into the hands of local chiefs. From time to time, some of them established a lordship over others. Tradition says that one such overlord, Vortigern, controlled an area from Kent to South Wales.

The Anglo-Saxon raids continued. These raids were part of a general migration of Germanic tribes in search of new land for their increasing population. Tradition says that the Anglo-Saxon settlement of England began in 449, when Vortigern invited two Jutish chiefs, Hengest and Horsa, to help him defend Kent against invading tribes. Hengest and Horsa later rebelled against Vortigern. Horsa died in battle, but Hengest and his descendants eventually conquered Kent, Sussex, Hampshire, and the Isle of Wight.

The Anglo-Saxon and Jutish settlers came from present-day Denmark and northern Germany. By about 550, the Jutes ruled in Kent, the Isle of Wight, and Hampshire. The Angles occupied the central part of southern Britain and the northern and eastern coasts. The Saxons settled around the River Thames. They advanced westwards to the Bristol Channel by 577 and to the Irish Sea by 613. By then, almost all of present-day England was under Anglo-Saxon rule.

Wherever the Anglo-Saxon settlers went, they displaced the local Romanized Celtic Britons, forcing them northwards and westwards into present-day Scotland and Wales. Some Britons took refuge in Cornwall or across the Channel in Brittany. In the 500's and 600's, the Angles made gains in Scotland and captured the land between Wales and the Celtic kingdom of Strathclyde. In the 700's, Offa, king of Mercia, built a defensive dyke that defined the English boundary with Wales.

For a fuller account of the Dark Ages in Scotland, see **Scotland, History of; Kings and queens of Britain and Ireland.**

Anglo-Saxon England. Altogether, seven Anglo-Saxon kingdoms developed in England—East Anglia, Essex, Kent, Mercia, Northumbria, Sussex, and Wessex. These kingdoms are often called the *heptarchy.* By the early 600's, Northumbria, Mercia, and Wessex dominated the other four kingdoms. In the 700's, Mercia had important commercial and diplomatic links with Europe. Mercia also produced fine coinage.

In the 800's, Wessex became the politically dominant kingdom. Egbert, its king, conquered the Welsh of Cornwall in 815. In 825, he defeated Mercia and seized Mercia's subject kingdoms of Kent and Sussex. In 827, Egbert forced Mercia and Northumbria to accept his overlordship. After 827, local kings still ruled in East Anglia, Mercia, and Northumbria, but Egbert claimed to rule the whole of England.

Egbert's successors include Alfred the Great, one of England's most significant early monarchs. Alfred was a great statesman, general, and man of letters. He wrote and translated books, opened schools, formed laws, and helped to found England's navy.

Among Alfred's descendants were two more outstanding kings. Athelstan, who ruled from 924 to 939, was acknowledged as overlord by the Danes and by the Celts of Scotland and Wales. Edgar the Peaceful, who reigned from 959 to 975, reformed the laws and coinage and founded religious institutions.

Important dates

449	According to tradition, King Vortigern invited Hengest and Horsa to help him defend Kent.
597	St. Augustine brought Christianity from Rome to Kent.
664	Synod of Whitby declared the Pope to be head of the Celtic Church.
827	Egbert of Wessex claimed to be king of all England.
1035	Canute died, and his English-Scandinavian empire collapsed.

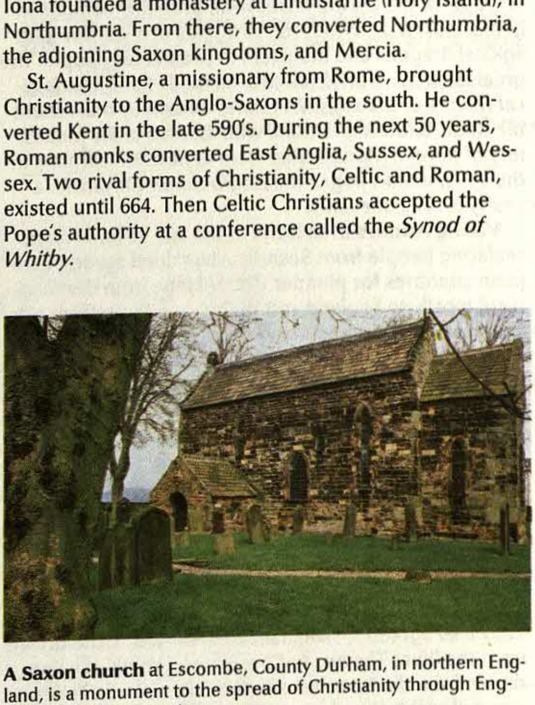
Anglo-Saxon life. The earliest Anglo-Saxon kings were military leaders who ruled with the aid of *thanes* (lords). People in the earliest Anglo-Saxon communities lived in crude villages of timber huts thatched with straw, reeds, or heather. By the 800's, village life had become more organized. The Anglo-Saxon kings had allotted land to their thanes and had made them overlords of some villages. Villagers became dependent on their thane and had to give him food and labour.

During the 800's, the English king began to rule with the aid of the *Witan,* a council of nobles and clergy. The Witan advised the king and was the highest law court. When a king died, the Witan chose a successor.

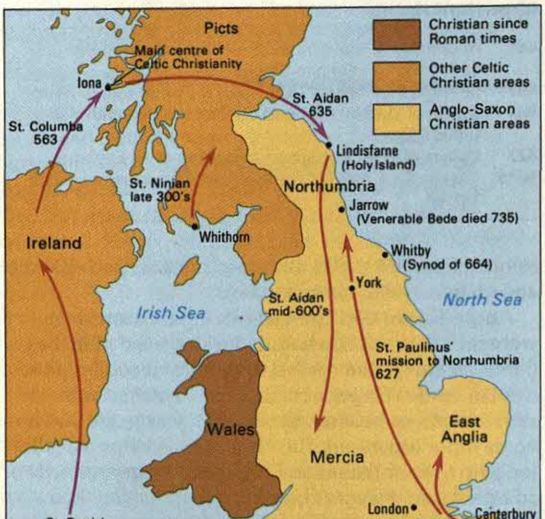
The Anglo-Saxon peoples spoke languages belonging to the Germanic group of languages. The speech of the Anglo-Saxons predominated in England and formed the basis from which the English language developed.

Religion and early literature in England. The earliest Anglo-Saxon settlers worshipped the sun, the moon, and such nature gods as Odin (Woden) and Thor. Christianity survived only in the Celtic areas of Britain. From the Scottish island of Iona, missionaries converted the northern Picts. St. Aidan and other Irish monks from Iona founded a monastery at Lindisfarne (Holy Island), in Northumbria. From there, they converted Northumbria, the adjoining Saxon kingdoms, and Mercia.

St. Augustine, a missionary from Rome, brought Christianity to the Anglo-Saxons in the south. He converted Kent in the late 590's. During the next 50 years, Roman monks converted East Anglia, Sussex, and Wessex. Two rival forms of Christianity, Celtic and Roman, existed until 664. Then Celtic Christians accepted the Pope's authority at a conference called the *Synod of Whitby.*



A Saxon church at Escombe, County Durham, in northern England, is a monument to the spread of Christianity through England in Anglo-Saxon times.


Picts
Main centre of Celtic Christianity
Iona
St. Columba 563
St. Aidan 635
Lindisfarne (Holy Island)
St. Ninian late 300's
Whithorn
Northumbria
Jarrow (Venerable Bede died 735)
Ireland
Whitby (Synod of 664)
York
St. Aidan mid-600's
Irish Sea
North Sea
St. Paulinus' mission to Northumbria 627
Wales
Mercia
East Anglia
London
Canterbury
St. Patrick came from Rome about 432
Wessex
Sussex
Kent
St. Augustine came from Rome 597
West Wales
English Channel
Christian since Roman times
Other Celtic Christian areas
Anglo-Saxon Christian areas

Christianity spread throughout Britain during the 500's and 600's. Much of the north was converted by missionaries from Ireland. St. Augustine introduced Christianity in the south.

Poetry was the earliest form of Anglo-Saxon literature. Scholars believe that Caedmon, a poet of the 600's, composed many religious poems. But only one of Caedmon's poems, his *Hymn,* has survived. The most important epic of the period is *Beowulf,* probably composed in the 700's. It describes the struggles of a warrior-king against dragons and monsters to protect his people. The greatest prose work from this period is the *Ecclesiastical History of the English People,* written by the Venerable Bede. Bede was a monk who studied at the monastery of Jarrow. Monasteries were centres of learning. In the 800's, monks began the *Anglo-Saxon Chronicle,* a yearly record of events.

Viking raiders in Britain. In the late 700's, *Vikings,* seafaring people from Scandinavia, raided several European countries for plunder. The Vikings from Denmark went mostly to England and Wales, and those from Norway went mainly to Scotland and Ireland.

Vikings first raided the Wessex coast in 789. They raided the Hebrides in 794 and Ireland in the next year. Their raids became more frequent in the 800's and 900's. They attacked Iona, Jarrow, Lindisfarne, and other rich monasteries. They plundered and burnt villages, took slaves, and left survivors to starve. Danish Vikings first settled permanently in England in 851. By 870, they had conquered every English kingdom except Wessex.

Alfred the Great defeated the Danes and made a treaty with them in 886. By the terms of this treaty, the Peace of Wedmore, the Danes accepted Christianity. They also agreed to live in an area north of a line drawn from the River Thames to Chester, and south of a line drawn from the River Tees to the Solway Firth. This area was called the *Danelaw.*

Danish Vikings founded the towns of Derby, Leicester, Nottingham, and Stamford. They also established trade between England and countries beyond the North Sea. York was a leading Viking town and trading centre.

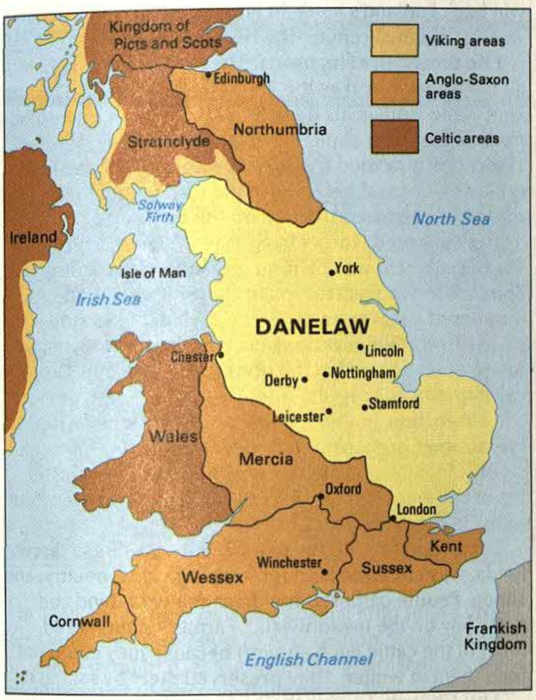
By 954, Wessex had conquered the Danelaw. But new Danish raiders arrived in the later 900's. King Ethelred II tried to buy them off with money raised from a land tax called *Danegeld.* But by 1013, the Danes had conquered most of England. In 1016, Canute, king of Denmark and Norway, also became king of England. But on Canute's death in 1035, his empire collapsed. In 1042, Ethelred's son, Edward, became king.

The Normans. King Edward, known as *the Confessor* because of his interest in religious matters, ruled from 1042 to 1066. He had no son, and a struggle for power developed.

When Edward the Confessor died, Godwin's son Harold became king with the Witan's support. His right to become king was immediately challenged by William, Duke of Normandy (now part of northwestern France). The Normans were a people descended from Vikings who had settled around the River Seine. They had adopted Christianity and the French language and had become powerful. William claimed the English throne because he was distantly related to Edward. Edward had been brought up in Normandy and supported William's claim. But Edward's death left power with Godwin's family, so Harold II came to the throne.

In September 1066, Tostig, Harold's brother, together with King Harald Hardrada of Norway, invaded northern

Lindisfarne monks in the 700's produced some wonderful work in making copies of the Bible. The decorated initial letter shown above is from a chapter in St. Matthew's Gospel.



The Danelaw was an area ruled by the Danes. Its boundaries were agreed in 886, when the Danes also accepted Christianity. On both sides of the Danelaw were Anglo-Saxon areas.

England. Harold II defeated them at the Battle of Stamford Bridge. But he had to turn south at once to oppose a landing in East Sussex by William. At the Battle of Hastings on October 14, the Normans defeated the Saxons and Harold was killed. The Norman conquest of England followed the Battle of Hastings.

The Norman Conquest (1066-1337)

William I was crowned king of England at Westminster Abbey, London, on Christmas Day, 1066. William was a Norman king who saw England as an extension of his French domains. He exercised strict and systematic control over his conquests. He raised taxes and redistributed land, granting most of it to *barons* (noblemen).

In return for their land, William's barons had to perform certain services. They and the bishops served as members of William's *Council,* which replaced the Anglo-Saxon Witan. The barons also had military obligations to serve as *knights* (army commanders) for William.

All land was divided into *manors.* Most manors contained a village. A baron was tenant-in-chief and had several manors. He passed on part of his military obligations to his tenants, who held manors from him. The tenants of each manor performed specific regular services for their lord. This type of land tenure and manorial and military organization is known as *feudal* tenure. Feudalism had been practised in Anglo-Saxon times, but under the Normans, it became more organized.

William faced serious resistance in his early years as king. The people of northern England, helped by a Danish force, revolted in 1069. William crushed the rising mercilessly. But stories were later written about Hereward the Wake, a heroic Saxon rebel, who resisted the Normans in the Isle of Ely, Cambridgeshire.

The Normans built many stone churches, including St. Bartholomew-the-Great in London. Norman churches and castles had thick walls, huge columns, and round-headed arches. An early type of Norman castle was a *motte and bailey.* This type of castle consisted of an artificial mound (the motte) surmounted by a wooden tower and enclosed by a moat and stockade (the bailey). Later, the Normans built great stone towers called *keeps.* The

Important dates

1066	William I defeated Harold II at the Battle of Hastings.
1086	England's wealth was recorded in the *Domesday Book.*
1135-1154	Civil War raged in England during Stephen's reign.
1215	The barons and the Church forced John to sign Magna Carta.
1265	Simon de Montfort was defeated in the Barons' War.
1282	Edward I annexed Wales to England.
1314	Robert Bruce freed Scotland from England at the Battle of Bannockburn.

The Bayeux tapestry, embroidered in the late 1100's, illustrates events that occurred between 1064 and 1066. It tells of relations between Harold, who became Harold II of England, and William, who became William I of England. The panels on the left show Harold being told of the sighting of a comet—a portent of evil.

Normans built nearly a hundred castles during William's reign.

In 1086, William's officials surveyed much of England to record the ownership, extent, and value of each manor. Their records formed the *Domesday Book,* which provided information for William's tax officers.

William II and Henry I, the sons of William I, continued their father's strong rule. But England was torn by civil war between 1135 and 1154, when Matilda, the daughter of Henry I, challenged the right of the fourth Norman king, Stephen, to rule. Most of the lords supported Stephen, believing that he would allow them more power. Before his death, Stephen promised that Matilda's son would become king as Henry II.

Henry II was the first *Plantagenet* king. He was a descendant of the French House of Anjou, whose emblem was a sprig of broom. The Latin for *broom plant* was *planta genesta,* which gave rise to the name *Plantagenet.* Henry reigned from 1154 to 1189. He proved to have a strong, authoritative personality. His successors were less effective. Richard I (the Lion Heart), who reigned from 1189 to 1199, wasted England's resources on crusades in the Holy Land. John, Richard's brother, reigned from 1199 to 1216. He clashed with his barons and also lost many of his French lands. Henry III, John's eldest son, was just as unsuccessful a ruler during his reign (1216-1272), and his barons waged war against him.

Henry's heir, Edward, crushed the rebellious barons. In 1272, he succeeded Henry III as King Edward I. Like Henry II, Edward was a man of authority. He passed important laws and skilfully influenced the development of Parliament. He suppressed a Welsh rebellion and *annexed* (joined) Wales to England in 1282. The annexation was not confirmed by a political Act of Union until 1536. But apart from a revolt led by Owen Glendower (Owain Glyn Dŵr) in the 1400's, Wales's political independence was ended by Edward I's military victories. Edward also brought Scotland under English control for a time.

Edward's son, Edward II, lost much that his father had won. He proved unpopular and easily influenced by favourites. His noblemen eventually forced him to *abdicate* (give up the throne). His son, Edward III, sought to win back England's lands in France, and in 1337, began a war against the French—the Hundred Years' War.

King Henry I continued the strong rule of his father, William I. Henry established his claim to the throne by seizing the treasury at Winchester, *above,* after the death of his brother William II.

Life under the Normans. The lord of a manor held all the manor's land as the king's tenant-in-chief. The lord kept some land as his *demesne.* He let other land go to *freeholders,* who could leave his manor if they wished. The rest was farmed by *villeins,* who were bound to stay on the manor and had to give the lord part of their produce. They also had to work on the demesne.

The cultivated land of each manor was in three large fields. Each field was divided into long, narrow strips. The lord kept several strips for himself, and allotted a number of strips to each villein. Each person's strips were distributed in various parts of the fields. By this arrangement, no one had all good or all bad land. Crops were grown in a regular, three-year rotation to prevent soil exhaustion. In the first year, one field grew wheat or rye, another grew oats or barley, and the third was left *fallow* (uncultivated). In the second year and in the third, the crops were rotated. As a result, each field grew two crops in the three years.

Some land around the manor, but outside the three fields, was *common* land for keeping cattle, poultry, and sheep. People gathered fuel from the woodland and grew hay on the meadowland. Farmers slaughtered most of the cattle each autumn because they could not feed them in winter. They preserved meat by salting it.

The Church. During the period of Norman rule, the Church was an important influence in the life of the people. Every village had its church, and every city had a *cathedral* (a bishop's church). Monks and nuns lived in monasteries and convents. The Church was wealthy. Many estates and manors were granted to it by kings or left to it in the wills of pious people.

Several quarrels occurred between the kings and the Church. Henry I and Archbishop Anselm disagreed about the appointment of bishops. Henry II and Archbishop Thomas à Becket disagreed about the powers of church courts. King John and Pope Innocent III also quarrelled about the appointment of bishops. John was eventually forced to submit to the Pope after Innocent III placed England under an *interdict,* depriving it entirely of the services of the Church.

The law. There was no single source of justice. The king's council was the supreme court, and in the last resort, the king was the *fount of justice.* But normally only great lords were tried by him. Freemen were usually tried by their fellow freemen in regional or local courts, called *shire* or *hundred* courts. Norman landowners also held courts and judged their tenants. Church courts tried clergy for all crimes except treason. They also tried lay people for such offences as adultery and heresy.

Under Anglo-Saxon law, a person could be cleared by the oaths of a group of men who believed the person to be innocent. But a person who was a known criminal or who had been caught in the act might have to undergo *trial by ordeal.* For example, the person might have to plunge an arm into boiling water. If the burns did not fester within three days, the person was judged to be innocent. In the 1200's, trial by jury began replacing trial by ordeal.

Henry I extended royal control over criminal cases and appointed royal officials in shire courts. Henry II sent judges throughout the country to hold royal courts.

King John signed Magna Carta in 1215, under pressure from the barons and bishops. Magna Carta granted many rights to the barons and the Church, and it forced the king to act within the law.

In 1215, the barons rebelled against King John's taxation. Under the leadership of Archbishop Stephen Langton, they forced him, at Runnymede, in present-day Surrey, to promise to observe their rights. They also forced him to accept *Magna Carta,* a charter that brought benefits to the common people as well as the barons. In Henry III's reign, Simon de Montfort led the barons in a rebellion against the king. This rebellion, called the Barons' War, ended with de Montfort's defeat at the Battle of Evesham in 1265. De Montfort had been the first person to summon ordinary citizens to discuss affairs of state with the barons and bishops. This idea led to the growth of Parliament.

England became involved in the crusades of the late 1100's. These Christian military expeditions were attempts to recapture the Holy Land from the Muslims. The crusades brought Britain into contact with the Muslim Empire. The crusaders evoked interest in Muslim art and brought home fine silk and spices.

Years of conflict (1337-1485)

In the mid-1300's, the feudal way of life began to decline. This decline was speeded by the *Black Death,* a plague that spread from China across Europe. It killed many people in Britain in 1348 and 1349. So many people died that the manorial system was totally disrupted.

The barons became less important owing to changes in the military system. Expanding trade brought the development of towns and of a wealthy middle class. Fresh, challenging ideas spread from Italy to Britain and other parts of Europe. The new ideas coincided with the growth of education and the invention of printing.

The decline of feudalism. The years from 1337 to 1485 were marked by long periods of war, which brought about important military changes. Campaigns became longer, and kings needed soldiers to fight longer than the period of feudal obligation. Soldiers with longbows proved more powerful on the battlefield than heavily armed knights. Kings preferred to take money—instead of military service—from tenants. With the money, they hired professional soldiers.

The effects of the Black Death hastened changes on the manor that had already started. As early as the 1100's, some manor owners had found it convenient to accept money as rent from their tenants instead of service. With the money, the lord could hire labourers. The system whereby a villein had rent changed from services to money payment was called *commutation.*

During the 1300's, lords of the manor who relied upon hired labourers found that the shortage of labourers after the Black Death caused a demand for higher wages. But rents paid by manorial tenants were fixed by custom and therefore remained unchanged. Some lords found it unprofitable to continue to farm their demesnes, and they leased the land to farmers who had become wealthy. Other lords turned their land over to sheep farming, which required less labour than crop growing. Still others tried to prevent hired labourers from getting higher wages, or tried to force villeins to work. Such actions aroused resentment.

In 1351, Parliament passed a Statute of Labourers, which banned increased wages for agricultural workers. A preacher named John Ball whipped up discontent over the law. In 1381, Wat Tyler, a blacksmith, led an uprising in southern England. But commutation continued and eventually replaced feudal service.

The end of the medieval wars. The Hundred Years' War between England and France was actually a series of wars that lasted from 1337 to 1453. The wars were

Important dates

1337	England and France started fighting in the Hundred Years' War.
1348-49	The Black Death spread across Britain.
1351	Parliament banned increased wages for agricultural workers.
1381	Wat Tyler led the Peasants' Revolt.
1415	Henry V's troops won the Battle of Agincourt.
1453	The Hundred Years' War ended.
1476	William Caxton set up the first printing press in Britain.
1485	Henry Tudor ended the Wars of the Roses and became Henry VII.

fought mainly because England wanted to recover French territory it had lost, and France wanted to regain territory England still held.

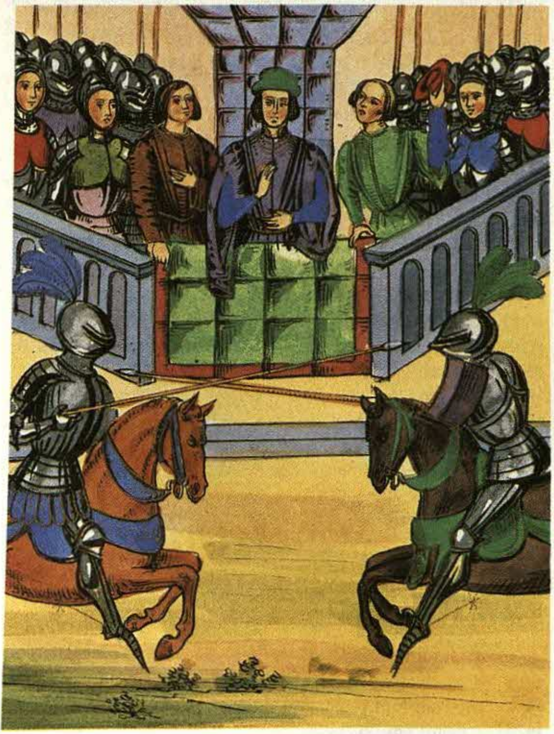
The wars began well for King Edward III, with two major English successes. The English routed the French at the Battle of Crécy in 1346, and again at the Battle of Poitiers in 1356, when they were led by the *Black Prince,* son of Edward III. The French recovered during the reigns of Richard II and Henry IV of England. Henry V resumed the attack on France in the early 1400's.

Most of the English successes came from the skill of Welsh archers in the use of the longbow. Henry V's Welsh archers were the decisive factor in the victory at the Battle of Agincourt in 1415.

In 1429, Joan of Arc, a farmer's daughter, inspired the French to fight successfully. The English captured Joan and burnt her at the stake in 1431. But the French went on winning. When the war ended in 1453, England had lost all its French possessions except Calais.

The English noblemen returned to England with their soldiers, many of whom became unemployed. These soldiers knew no craft but fighting. They fought private wars, and gladly served ambitious noblemen whose rival armies took to brigandry.

Two years after the end of the Hundred Years' War, the private armies began to fight a series of civil campaigns called the Wars of the Roses (1455-1485). Two groups of nobles, *Lancastrians* and *Yorkists,* fought for control of the throne. For badges, the Lancastrians wore red roses, and the Yorkists wore white roses. The wars resulted from the conflicting claims of two royal houses. The House of Lancaster was descended from Henry IV, who had gained the English throne in 1399 after having Richard II murdered. Henry's father, John of Gaunt, was Duke of Lancaster and a son of Edward III. The rival House of York was descended from another son of Edward III, Edmund, Duke of York.



Jousting, a tournament between knights on horseback, was a popular event, particularly in the 1300's.

Soldiers awaiting battle at Crécy in 1346 included archers with longbows, who proved decisive in the English victory.

Henry VI, a Lancastrian king, was a weak-minded man incapable of governing. In 1461, the Yorkists, led by the powerful Earl of Warwick, deposed Henry VI and made Edward of York king as Edward IV. Edward survived attempts to dethrone him, and except for a few months in 1470 and 1471, he remained king until his death in 1483. Edward's son, a boy of 13, became king in 1483 as Edward V. But he was never allowed to reign and later died mysteriously, probably having been murdered. Edward IV's brother then became king as Richard III, but he soon lost popular support. In 1485, Henry Tudor, a Lancastrian claimant, landed in Wales with an army. He defeated and killed Richard in a battle at Bosworth Field, in Leicestershire, and became king as Henry VII.

Religious developments. A major source of discontent during the 1300's was the requirement upon the people to pay heavy taxes to the popes. These taxes, known as *Peter's Pence,* were resented because the prestige of the popes had fallen. People also resented the powers of Church courts and the privileges of the priests, some of whom were lazy and dishonest. John Wycliffe, a rebel priest, expressed the general discontent. He sent poor preachers, called *Lollards,* throughout the country. The Lollards, who risked being burnt as heretics, preached secretly to the people about the Bible, which Wycliffe had translated into English.

The growth of trade. The *woolsack,* a seat still used by the lord chancellor in the House of Lords, is a reminder that medieval England's most important export was wool. English wool was considered the best in Europe. Much of it went to Flanders (now mainly in Belgium) to be woven into cloth. In 1336, Edward III brought some Flemish weavers to England to develop the English woollen-cloth industry. Soon, exports of raw English wool declined, and the manufacture and export of English cloth increased.

Increasing trade led to the expansion of such towns as London, Norwich, Perth, and Stirling. But most medieval towns were small. Townspeople sold most of their candles, clothes, farm implements, and other manufactures to people in the surrounding countryside. As towns grew, the citizens bought charters from the king or from their lords. A charter freed the townspeople from feudal obligations and gave them the right to appoint a mayor and other officials.

The possession of a charter also gave townspeople the right to set up *guilds* to control their trades and industries. At first, every town had one *merchant guild* to control all its trades. In the 1300's, this was replaced in most towns by several *craft guilds,* each controlling a particular trade. Members of a craft guild were all skilled master-craftsmen. The guilds prevented outsiders from becoming craftsmen inside the towns. They also regulated prices, standards of work, and wages. The guilds shared in the social life of the town, holding feasts, caring for needy members, and performing *mystery plays,* which usually centred on religious themes.

Some towns held a weekly market at which local people bought and sold goods. Others staged annual *fairs,* which drew people from far and wide.

During this period, foreign merchants conducted much of Britain's overseas trade. Some lived in Britain. They included Venetians and merchants of a mainly German trading alliance called the *Hanseatic League.*

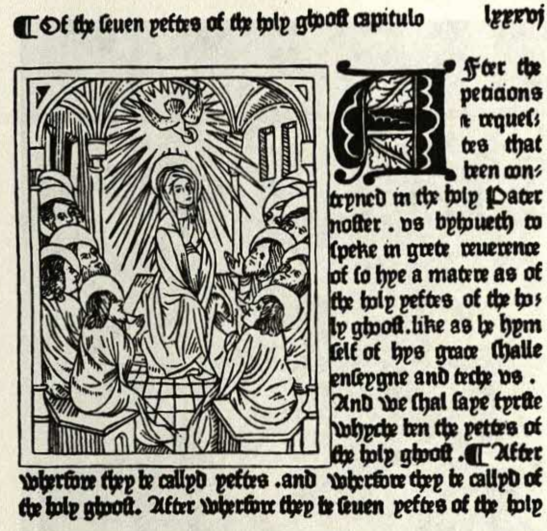
The spread of learning. In Norman times, the kings and nobles of England had spoken French. But after the loss of Normandy in 1204, they had begun to speak English, which was enriched by the addition of many French words. English literature flourished in the 1300's. Great works included John Wycliffe's Bible and Geoffrey Chaucer's *Canterbury Tales.*

English education had already been stimulated by the foundation of universities at Oxford and Cambridge in the late 1100's. William of Wykeham established the first large school, Winchester College, in 1382. In the 1400's, Britain felt the influence of the *Renaissance,* a surge of ideas that began in Italy with the revival of ancient Greek and Roman learning. New subjects of study widened the teaching of schools and universities. For the first time, a class of educated lay people arose. William Caxton set up the first printing press in England near Westminster Abbey, London, in 1476. Printers soon produced books cheaply and in great numbers.

Widening horizons (1485-1603)

In 1485, England and Wales came under the strong rule of the Tudors. The Tudor period was an age of new ideas and developments. The influence of the Renaissance dominated literature and other arts. Religious changes called the *Reformation* and *Counter-Reformation* had varying effects. The Tudor monarchs increased the power of the Crown and achieved good government and internal peace and order. Changes in farming and in manufacturing brought increased prosperity. The exploits of seamen led to the expansion of trade and the beginnings of colonization.

The early Tudors. The Tudor monarchs were supported by the new middle class of merchants. The middle class wanted a monarchy that could preserve the stable peace necessary for commercial prosperity. They provided the monarchy with officials and administrators, and they strengthened it against the nobles, who had been seriously weakened by the Wars of the Roses.



¶Of the ſeuen yeftes of the holy ghooſt capitulo lxxxvj

After the peticions ⁊ requeſtes that been conteyned in the holy Pater noſter . vs byhoueth to ſpeke in grete reuerence of ſo hye a matere as of the holy yeftes of the holy ghooſt.like as he hym ſelf of hys grace ſhalle enſeygne and teche vs . And we ſhal ſaye fyrſte whyche ben the yeftes of the holy ghooſt .¶After wherfore they be callyd yeftes .and wherfore they be callyd of the holy ghooſt. After wherfore they be ſeuen yeftes of the holy

Printing helped to widen people's horizons. William Caxton set up England's first printing press in 1476. The text and illustration shown above are from *The Royal Book,* printed in 1484.

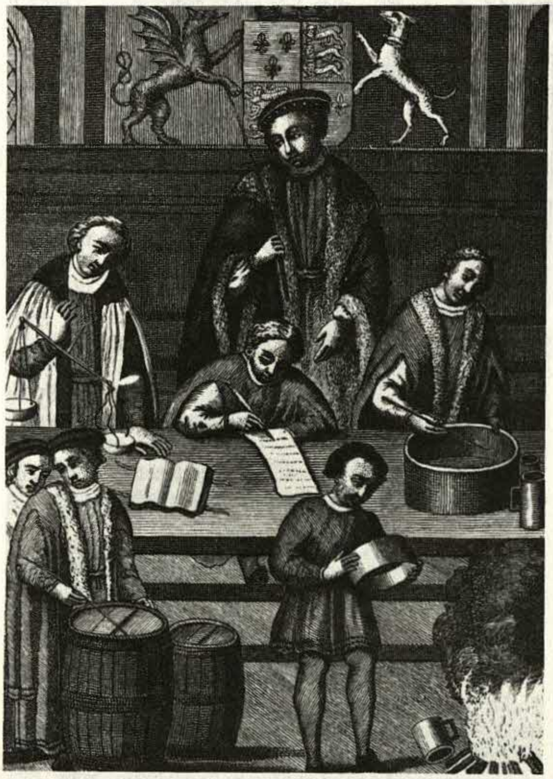
Henry VII brought about the conditions for later Tudor greatness. He set up a *Court of Star Chamber* and used it to make the barons disband their private armies. He restored royal finances by collecting taxes strictly and by forcing wealthy people to make loans to his treasury. He extended royal control over local government through the local magistrates called *justices of the peace.* Henry crushed revolts by the pretenders Lambert Simnel and Perkin Warbeck.

Henry VIII, the son of Henry VII, had two very able ministers, Cardinal Wolsey and Thomas Cromwell. After serving the King for nearly 20 years, Wolsey was dismissed and disgraced for failing to secure the Pope's permission for Henry to divorce his first wife, Catherine of Aragon. Cromwell succeeded Wolsey, had 10 years of power, and was executed. Henry was at first loyal to the Pope, who in 1521, gave Henry the title *Defender of the Faith* for writing a pamphlet defending the Church's doctrines. But his failure to secure papal agreement for his divorce led Henry to break from Rome's authority.

From 1512 to 1514, England fought both France and Scotland. But the shifts of European politics caused France to seek England's aid against the Holy Roman

Important dates

1496	John and Sebastian Cabot discovered Newfoundland.
1521	The Pope made Henry VIII *Defender of the Faith.*
1534	Henry VIII made himself head of the Church.
1536	Parliament formally incorporated Wales into England.
1541	The Irish Parliament declared Henry VIII *King of Ireland.*
1545	Henry VIII's naval flagship *Mary Rose* sank.
1549	The first English Prayer Book was published.
1553	Mary Tudor became queen, and England became Catholic again.
1558	Elizabeth I became queen, and England became Protestant.
1560	The Scottish Church became Presbyterian.
1588	English seamen defeated the Spanish Armada.
1601	The Poor Law regulated the treatment of beggars.



More efficient administration was one of the factors leading to Tudor greatness. The supervision of weights and measures was improved during the reign of Henry VII.

Emperor Charles V, who was also ruler of Spain. In 1520, Francis I, the French king, invited Henry to a ceremonial meeting in Picardy, France. The meeting was so splendid that the place it was held became known as the *Field of the Cloth of Gold.* Francis failed to win Henry's support at the meeting. Soon afterwards, Charles V made a treaty with Henry against France.

The English Reformation. In the early 1500's, parts of Europe became Protestant. Protestant influences reached England and increased religious discontent there. Many English people resented papal taxation and clerical privilege and wealth. Many wanted an English Bible and church services in English instead of Latin.

The English Reformation coincided with Henry VIII's attempt to get papal agreement for his divorce. The Reformation abolished the pope's authority over the Church of England. In 1534, Parliament made Henry head of the Church of England. Some people, including the lord chancellor, Sir Thomas More, were executed for opposing Henry's divorce. Henry did not favour Protestant ideas, so worship changed little during his reign. But an English Bible was placed in every church for people to read. This translation of the Latin Bible was largely the work of Miles Coverdale.

In the late 1530's, through Thomas Cromwell, Henry dissolved the monasteries and took over their land and wealth. The monks received pensions, and some were compensated in other ways as well. A rising against Henry's action, called the *Pilgrimage of Grace,* took place in the north. It was mainly a protest against the dissolution of the smaller monasteries. But the rebels were also discontented with changes in agriculture.

Henry VIII sold most of the monastery lands to strengthen his treasury and pay for his overseas wars and ambitions. Speculators bought much of the land and quickly resold it for profit. A new class of landowner came into being in England.

For information on the history of this period in Scotland, see **Scotland, History of.**

The Irish. Henry II of England had allowed his Norman barons to interfere in Ireland's affairs in 1169. In 1171, to prevent the barons from setting up their own kingdoms there, he had declared himself Lord of Ireland. But Henry did not try to halt the conquest of Ireland by the Anglo-Normans (Norman barons from England). By the late 1200's, about three-quarters of Ireland was controlled by powerful Anglo-Norman families.

The Wars of the Roses weakened English rule in Ireland. By 1485, the English governed little more than the *Pale,* a small area around Dublin. Henry VII sent an army to Ireland to compel the Irish Parliament to obtain his approval before it could meet and propose bills.

Henry VIII also tried to subdue Ireland. But the Fitzgeralds, a noble Irish family, challenged his power. In 1537, Henry hanged the Earl of Kildare (a Fitzgerald) and his five uncles at Tyburn, in London. In 1541, the Irish Parliament granted Henry the title *King of Ireland.* For a full account of the history of Ireland during these times, see **Ireland, History of.**

The later Tudors. When Henry VIII died in 1547, his 9-year-old son, a child dogged by illness, became king as Edward VI. Because Edward was under legal age, a *lord protector* governed the kingdom. The first lord protector, the Duke of Somerset, was overthrown by the Duke of Northumberland in 1551. During Edward's reign, the Protestants made more changes in the Church of England. Thomas Cranmer, archbishop of Canterbury, wrote the *Book of Common Prayer* in English for use in church services.

When Edward VI died in 1553, the Duke of Northumberland proclaimed Jane Grey, a second cousin of Edward, as queen. But most of the people supported Mary Tudor, Edward's half-sister. Mary became queen within a few days. Jane was arrested and later executed. Mary, a Roman Catholic, restored papal authority over the Church of England and enacted a policy of persecution against Protestants. More than 300 people were burned at the stake during her short reign, earning her the nickname "Bloody Mary."

In 1554, Mary married Philip, the son of the Hapsburg Emperor Charles V. In 1555, her husband became Philip II of Spain. The marriage was unpopular in England. By the marriage treaty, Philip became king of England with limited power. When Mary died childless in 1558, Philip's power in England ceased. During Mary's reign, Calais, the last English possession on the European mainland, was lost to the French.

Elizabeth, Mary's half-sister, became queen in 1558. She again abolished papal authority over the English Church. In foreign affairs, she played for time, avoiding war with Spain until England became strong at sea.

The Elizabethan Era. The reign of Elizabeth I was a prosperous period. Clothiers organized the expanding cloth industry into the *domestic system.* By this system, they bought wool from farmers, distributed it to spinners and weavers who worked at home, and then sold or exported the finished cloth.

The clothiers offered good prices for wool, and sheep farming became profitable. Some lords of the manor enclosed land in order to keep sheep. They thereby deprived tenants of their land-holdings. Some tenant farmers became homeless beggars. Parliament passed several laws to deal with this situation. An important law of 1601, the Poor Law, regulated the treatment of beggars to provide them with relief. In time, England's growing prosperity provided new jobs.

The Elizabethan Age was important culturally. Popular pleasures included archery, bowls, dancing, and bear-baiting. People liked music, and wealthy people were expected to play musical instruments on social occasions. People also enjoyed dressing up. They acted masques, pageants, and plays at Christmas and other special times. Great men of talent during this period included William Shakespeare, England's greatest dramatist; Sir Philip Sidney, a poet and soldier; and Thomas Tallis and William Byrd, outstanding composers.

The seamen. In 1492, Christopher Columbus reached the Americas, and five years later, Vasco da Gama sailed a new route to India. These discoveries made Spain and Portugal rich. In 1496, Henry VII of England authorized John Cabot and his son, Sebastian, to sail northwestwards to seek another way to India. They failed, but discovered Newfoundland, on the east coast of North America, with its valuable fishing grounds. Henry VII also improved the navy. He built six royal warships and a dry dock at Portsmouth. Henry VIII built 50 more ships, including the flagship *Mary Rose.* He set up Trinity House in 1514 to maintain pilots at ports and beacons on the coast.

During Elizabeth's reign, many English seamen continued to seek alternative routes to India. Others sought trade with Spanish colonies in America. A few took black slaves from western Africa and sold them to European colonies in Central and North America. But after Captain John Hawkins was attacked by the Spaniards in a Mexican port in 1567, many English seamen became *privateers* and attacked Spanish ships and ports. One privateer, Sir Francis Drake, sailed round the world between 1577 and 1580. He returned rich with plunder.

Elizabeth I made herself head of the Church when she led England back to Protestantism. Most English people accepted the change willingly. A picture from the time shows her at prayer.

Other English seamen tried to found overseas colonies but were unsuccessful. Sir Humphrey Gilbert died in 1583 while attempting to colonize Newfoundland. His half-brother, Sir Walter Raleigh, also failed in his bid to found a colony in Virginia, North America.

Overseas trading companies established in Tudor times became successful and prosperous. From 1555, the Muscovy Company ran a flourishing trade with Russia. The East India Company, founded in 1600, in time brought most of India under its rule.

Martyrdom of Protestants happened during the reign of Mary Tudor, who restored the Pope's authority over the Church of England. Bishops Latimer and Ridley were burnt at the stake in Oxford in 1555.

Rivalry between England and Spain finally led to war. Spain wished to crush England because England was Protestant and because English ships raided Spanish colonies and competed with Spanish settlers and traders. In 1588, Philip II launched a huge armed fleet called the *Armada* against England. But English seamen defeated it.

Constitutional changes (1603-1714)

The hundred years that followed the death of Elizabeth I brought violent and far-reaching changes to government in Britain. England and Scotland, though retaining separate parliaments, were united under one king. The English Parliament came into fatal conflict with the monarchy over control of the government. A bitter civil war ensued, in which the forces of Parliament triumphed and the king was executed. After a period of trying other forms of government, the people restored the monarchy but gave it greatly reduced powers.

Many important intellectual and cultural developments occurred during this period. William Harvey discovered how blood circulates in the body. Inigo Jones became the first important English architect. John Donne, Ben Jonson, Andrew Marvell, and John Milton dominated English poetry. Orlando Gibbons was a leading musical composer.

The union of the kingdoms. Elizabeth I never married and had no children. But her cousin, Mary, Queen of Scots, whom she had executed for treason in 1587, was the mother of James VI of Scotland. When Elizabeth died in 1603, the Scottish king also became king of England as James I. The two kingdoms kept their own laws and parliaments. The union was symbolized by a new national flag, the *Union Flag.* This flag, which was adopted in 1606, combined the English flag of St. George with the Scottish flag of St. Andrew.

James I met many difficulties. The Roman Catholics tried to regain for their religion the influence that it had had before Elizabeth I's reign. In 1605, a group of extremist Roman Catholics tried to kill James and the Members of Parliament. Their conspiracy is known as the *Gunpowder Plot.* The *Puritans* (strict Protestants) also opposed James I. They wished to reform the Church of England to remove the ritual practices that had remained in its services after its break with Rome. In 1604, James presided over the Hampton Court Conference. This meeting mainly sharpened disputes between the bishops and the Puritans. However, the bishops, and some Puritan clergymen, did agree to produce a new English Bible. This, the Authorized Version of the Bible, was published in 1611.

Puritan members of Parliament continually sought religious changes unacceptable to James. Parliament also wanted a greater share in the government. James denied its requests, claiming *divine right* (authority direct from God). He was swayed by his favourites, notably the Duke of Buckingham.

English sailors made further voyages of discovery. William Baffin and Henry Hudson sailed into the frozen north of Canada, where several geographical features still bear their names. The first permanent English colony, Jamestown, in Virginia, was founded in 1607. Another successful English colony was established about 1612 on the island of Bermuda in the North Atlantic.

Important dates

1603	Scotland and England were united under one king, known as James I of England or James VI of Scotland.
1605	Extremist Roman Catholics tried to kill James in the Gunpowder Plot.
1611	The Authorized Version of the Bible was produced.
1628	Parliament passed a Petition of Right.
1629-1640	Charles I ruled without Parliament.
1638	Thousands of Scots signed the Solemn League and Covenant.
1640	The Scots invaded northern England and Charles recalled Parliament.
1642-1651	Royalists fought Parliamentarians in the Civil War.
1649	Charles I was beheaded by Parliament.
1649-1660	England was a republic called *The Commonwealth.*
1660	The monarchy was restored, and Charles II became king.
1688	Parliament dethroned James II in the Glorious Revolution.
1707	In the Act of Union, England and Scotland were formally united as the *United Kingdom of Great Britain.*

Plymouth, in Massachusetts, was founded in 1620 by the Pilgrim Fathers. The Pilgrim Fathers were English Puritans who sailed in the ship *Mayflower* to seek a place where they could worship freely.

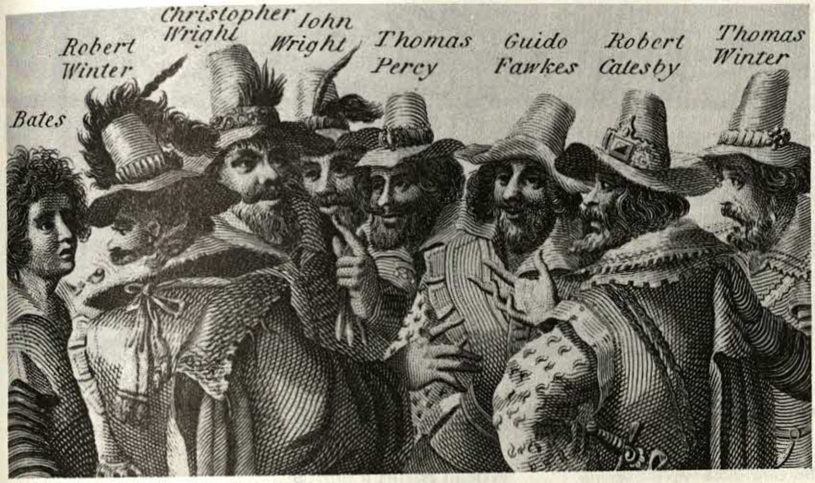
The king and Parliament. After Charles I became king in 1625, the dispute between the Crown and Parliament worsened. The Duke of Buckingham, who influenced Charles as he had James, was murdered in 1627. In 1628, Parliament angered Charles by passing a Petition of Right. This laid down the areas of government in which Parliament sought control. From 1629 to 1640, Charles ruled without Parliament. He raised taxes in various ways, including some that many people thought illegal. He levied on all parts of the country a tax called *ship money,* ostensibly to pay for the rebuilding of the navy.

Charles supported the religious policy of William Laud, who became Archbishop of Canterbury in 1633. Laud punished clergymen who refused to use the official Prayer Book. This action caused many Puritans to follow the Pilgrim Fathers to North America.

In 1637, Charles and Laud attempted to make the Scottish Presbyterians use the Prayer Book. In 1638, thousands of Scots signed the *Solemn League and Covenant,* in which they promised to defend their religion. Charles sent an army into Scotland, but no fighting occurred. His ablest minister, the Earl of Strafford, then advised him to call a Parliament. This Parliament refused to grant Charles money, and he dismissed it immediately. It became known as the *Short Parliament.*

Charles raised another army, which was defeated by the Scots. He then called another Parliament, afterwards called the *Long Parliament.* This Parliament, led by the Puritan John Pym, continued to oppose Charles. It imprisoned and later executed both Strafford and Laud. It abolished the Court of Star Chamber, first set up by Henry VII and used by Charles against his opponents, and prohibited Charles from raising money without Parliament's permission. Charles reacted angrily to these moves, and in 1642, events moved rapidly towards the outbreak of the English Civil War in August. See **Civil War, English; Star Chamber.**

The Civil War was fought between the *Parliamentarians* (supporters of Parliament) and the *Royalists* (supporters of Charles I). It proved an intensely bitter conflict that split communities and even families. Parliamentar-



The Gunpowder Plot is an event that is remembered each November 5. Catholic plotters tried to blow up Parliament and James I on that date in 1605. In this picture of the plotters, Guy Fawkes, the best-remembered, is third from the right.

ians wished no harm to Charles. They merely wanted him to be reasonable and stop listening to bad advice from his counsellors. But Charles would not betray his friends, and he let the war drag on. The decisive factor that brought his defeat was the rise of the New Model Army, a professional force that had as one of its commanders a Huntingdonshire landowner called Oliver Cromwell. Through the army's insistence, Charles was tried and executed in 1649.

Prince Charles, the son of King Charles I, had taken refuge in France in 1646. He returned to Britain to claim the monarchy. But Cromwell defeated him at the Battle of Worcester in 1651, and he fled abroad again.

The Commonwealth. After the execution of King Charles I, the monarchy and the House of Lords were abolished. A new kind of government called the *Commonwealth* was set up. Cromwell was the most powerful person in Britain because the army supported him. He wished to develop a new and permanent form of government. But he met much opposition. Cromwell suppressed a democratic group called the *Levellers,* and he used troops to dissolve the Long Parliament.

In 1653, the army set up a military *dictatorship* (nonelected leadership) called the *Protectorate.* Cromwell became *lord protector,* but the House of Commons challenged his rule. In 1655, Cromwell dissolved Parliament, and for about a year, ruled through officers called *major generals.* Yet another Parliament, which was elected in 1656, was dissolved in 1658.

The Commonwealth government won successes overseas. It passed a Navigation Act in 1651, which ordered all imports to be carried in English ships or in ships of the country of origin. This brought war with the Dutch, who shipped goods for the commercial nations of the world. A war with Spain, about British rights to trade with Spanish colonies in America, lasted from 1655 to 1659. Jamaica was won from Spain and thereby became the first English colony to be taken in war. Cromwell's soldiers also carried on a ruthless campaign in Ireland. See **Ireland, History of.**

But the Commonwealth remained unpopular with many people. The Puritans forbade people to use the Prayer Book. They also suppressed theatres, bear-baiting, and other amusements. People resented the army's rule and the heavy taxes imposed for its upkeep.

When Cromwell died in 1658, his son, Richard, became lord protector. But he soon resigned. General George Monk, military governor of Scotland, marched to London and recalled the Long Parliament. Parliament restored the monarchy, and Prince Charles returned to England to be crowned King Charles II in 1660.

The Restoration. Charles was a popular, pleasure-loving king. He was notorious for his many flirtations with women, including the actress Nell Gwyn, and for the number of illegitimate children he fathered. But Charles was also a man of culture and vision. Under his patronage, the Royal Society and Royal Observatory were founded, marking the beginning of modern science in Britain.

Charles II also helped to foster the more relaxed social atmosphere into which the country emerged after the restrictions of Puritanism were removed. London became a lively and colourful city. Two Londoners, Samuel Pepys and John Evelyn, wrote accounts of the times in their diaries. Theatres reopened. The first coffee houses appeared, and some of them developed into the first clubs. Londoners danced in the Strand on May Day, and country people celebrated similarly in the villages. London became more crowded. Coaches and wagons jammed the roads. Newly fashionable *sedan chairs,* which were one-passenger enclosed chairs carried on poles by two bearers, added to the congestion. However, two successive disasters marred the gaiety: the Great Plague in 1665 and the Great Fire in 1666.

The reign of Charles II was a time of artistic, intellectual, and social development. Henry Purcell composed great music, and Sir Christopher Wren dominated English architecture. John Locke contributed much new thought to philosophy. More English colonies were established in North America. They included Pennsylvania, founded by the Quaker William Penn in 1682.

An Act of Religious Uniformity was passed in Charles II's reign to enforce the use of the Prayer Book. The Conventicle Act (1664) and the Five Mile Act (1665)—both part of the *Clarendon Code*—banned preaching by Nonconformist ministers near towns. The state also continued its hostility to Roman Catholics. In 1673, Parliament passed a Test Act, reserving official posts for members

The Great Plague killed more than 70,000 Londoners in the summer of 1665. Many people fled from the city to try and escape from the dreadful disease, for which there was no known cure.

of the Church of England. Some Catholics were executed after the Popish Plot of 1678, a fictitious conspiracy invented by Titus Oates, a Protestant extremist.

Fear of the Roman Catholics caused Parliament to try to pass the Exclusion Bill to stop Charles's Roman Catholic brother and heir, James, from ever becoming king. Charles prevented the bill becoming law by dismissing Parliament. In 1683, an attempt against the lives of Charles and James, called the *Rye House Plot,* failed.

The Fire of London started on Sept. 2, 1666. It swept through the City of London and destroyed more than 13,000 houses.

When Charles II died in 1685, James became king as James II. His Roman Catholicism caused a Protestant rising in the west to occur. The rebels wanted to depose James and make the Duke of Monmouth king. But Monmouth was defeated at the Battle of Sedgemoor and was later executed. Judge George Jeffreys sentenced many rebels to death or banishment at a court afterwards called the *Bloody Assize.* James broke the law by appointing Roman Catholics to state and Church posts. He tried to win Puritan support by issuing a *Declaration of Indulgence,* ending discrimination against Roman Catholics and Puritans. Seven bishops protested, and James imprisoned them in the Tower of London.

James had two Protestant daughters. Many members of Parliament felt that they could endure James, provided that one of his daughters succeeded him. But in 1688, James had a son, whom he planned to bring up as a Roman Catholic. This frightened some politicians. They invited the Dutch ruler William of Orange, husband of James II's elder daughter, Mary, to invade Britain. William landed in Dorset and marched on London, where he was welcomed. James fled to France.

The Glorious Revolution. People called the events of 1688 the *Glorious Revolution* because the change of rulers came almost without bloodshed. Parliament made William and Mary joint rulers, as William III and Mary II. Parliament also passed the Bill of Rights, limiting royal power. This law forbade Roman Catholics to succeed to the throne and enforced frequent meetings of Parliament. Parliament also passed a Toleration Act, granting freedom of worship to *Dissenters* (Protestants outside the Church of England) but not to Roman Catholics.

James led a rebellion against William in Ireland. But in 1690, William defeated James at the Battle of the Boyne. This event is still celebrated by Protestant Irish people nicknamed *Orangemen* (supporters of William of Orange). James fled back to France.

William III remained ruler of the Netherlands. He sought to defend the Netherlands against France and enlisted England's support for an alliance called the *League of Augsburg.* The league fought France from 1689 to 1697 and saved the Netherlands. The English government's need for money in the war encouraged William Paterson to found the Bank of England in 1694. The Bank's subscribers lent the state 1,200,000 English pounds.

Mary II died in 1694, leaving William III no children to succeed him. In 1701, Parliament passed the Act of Settlement to ensure that future monarchs would be Protestants. According to the Act, if Mary's sister, Anne, had no surviving children at her death, the throne would pass to the Electress Sophia of Hanover, who was a granddaughter of James I, or to her heirs.

William died in 1702 and was succeeded by Anne. Her reign saw the emergence of two new political parties, the *Whigs* and the *Tories.* These two groups had first appeared during the Exclusion Bill crisis of 1683. The Tories had supported the exclusion of James and were largely a Protestant-based party. For most of Anne's reign, the Whigs had a majority in the Commons. But a general election in 1710 gave the Tories their first Parliamentary majority.

The most important constitutional event of Anne's reign was the Act of Union, passed in 1707. This act made the kingdoms of Scotland and England into the *United Kingdom of Great Britain.* Scotland sent members to the Parliament at Westminster, but the Church of Scotland and Scottish law remained unchanged.

Overseas developments. From 1702 to 1713, Britain fought France in the War of the Spanish Succession to prevent the grandson of King Louis XIV of France from becoming king of Spain. Britain would not allow the Spanish Netherlands (now Belgium) to fall under French control. The Duke of Marlborough drove the French out of the Netherlands. The British Navy captured Gibraltar from Spain in 1704 and kept it at the Peace of Utrecht (1713). Britain gained the *Asiento* (the monopoly of selling black slaves to Spanish colonies) and won territories in Canada from France.

Years of transition (1714-1837)

England before 1763. At the beginning of the 1700's, England was still mainly a nation of rural villages and country towns. Travelling was hazardous, and few people made long journeys. By the middle of the 1700's, the Industrial Revolution was underway. It swept away many aspects of rural life.

When Anne died in 1714, she was succeeded by Sophia of Hanover's heir George. King George I, a middle-aged German, never mastered the language of his new kingdom. Soon after George's succession, the Whigs returned to power. A *Cabinet Council* consisting of the most important ministers came into being. But because he did not speak English well, George did not attend ministers' meetings regularly. A senior minister, Sir Robert Walpole, began to run the Cabinet and to manage Parliament. Walpole's power lasted from 1721 to 1742, and he was regarded as the *prime* (first) minister.

The arts. During the early 1700's, English painters followed the tradition of portrait painting established by Sir Godfrey Kneller. William Hogarth painted satirical scenes from contemporary life. William Kent and Sir John Vanbrugh built grand houses in what became known as the *Early Georgian* style. George Frideric Handel, a German-born musician, composed operas and choral works. Joseph Addison and Richard Steele wrote outstanding essays. Jonathan Swift wrote satires, including *Gulliver's Travels.* Alexander Pope composed outstanding poetry, and Oliver Goldsmith wrote dramas, poetry, and prose. Daniel Defoe wrote *Robinson Crusoe* and contributed to the development of the novel. Early novelists included Henry Fielding, Samuel Richardson, Tobias Smollet, and Laurence Sterne. Samuel Johnson greatly influenced other writers.

Important dates

1720	Many investors lost their money in the South Sea Bubble.
1733	John Kay invented the flying shuttle.
1756-1763	British armies defeated the French in India and Canada.
1764	James Hargreaves invented the spinning jenny.
1776	American colonists issued the Declaration of Independence.
1798	A rebellion in Ireland was suppressed.
1801	An Act of Union formed the *United Kingdom of Great Britain and Ireland.*
1805	Nelson won the Battle of Trafalgar, ending the risk of an invasion of Britain by Napoleon.
1807	Britain abolished the slave trade.
1815	The Battle of Waterloo ended the Napoleonic Wars.
1832	Parliament passed the first Reform Act.
1833	Slavery was banned throughout the British Empire.
1833	Parliament passed the first effective factory act.

Science. Sir Isaac Newton discovered the principles of gravitation and formulated the laws of motion. Edmund Halley correctly predicted the return in 1759 of the comet now known by his name.

Popular entertainments still included bear-baiting and cockfighting. The first rules for prizefighting were framed in 1743. The hunting of deer and hares declined, and wealthy landowners took to fox-hunting. Cricket became a national game. Croquet amused aristocrats. Horse racing and gambling were popular.

Economic and social conditions. A great expansion of trade attracted investment in commercial companies. Feverish gambling in stocks and shares took place. In 1720, many investors in the South Sea Company lost their money in a disaster called the *South Sea Bubble.*

The powerful landed aristocrats were elegant and dignified. Their great houses and trim parklands showed a cultivated sense of artistry. They gave stately balls and receptions, collected art treasures, and patronized skilled craftworkers. Yet many fought duels and led dissolute lives.

Alongside the elegance and luxury, many people lived in conditions of dirt, disease, and poverty. Towns were insanitary, unpaved, and unlit. Many of London's people lived crowded together in slums. Many poorer people drank cheap gin. Riots were a frequent occurrence. Conditions resulted in a high death rate. Crime flourished almost unchecked, but people who could not pay debts were imprisoned.

Some people tried to improve social conditions. They founded *charity schools* for some of the children of poor people. Thomas Guy established Guy's Hospital, in London. Thomas Coram set up a foundling hospital for deserted babies. James Oglethorpe founded the American colony of Georgia as a refuge for debtors. Henry Fielding organized the *Bow Street runners,* the first regular police in London.

Overseas affairs before 1763. British overseas commerce expanded. British colonies provided a market for goods from home. Tropical products from the colonies, such as cotton, sugar, and tobacco, were sold profitably in Europe after being processed in Britain. British merchants also traded in slaves. Bristol and Liverpool grew rich on the profits of slavery. The cotton industry developed quickly, and the wool industry declined.

In 1739, a war between Britain and Spain became part of a general European struggle, the War of the Austrian Succession (1740-1748). In this conflict, Britain once more fought France.

In 1756, Britain and France went to war again, in the Seven Years' War. Its main causes were disagreements over colonial trade, and most of the war was fought in America, Canada, and India. In India, France's ally, the Nawab of Bengal, captured Calcutta. But in 1757, Robert Clive of the East India Company recaptured it and won the Battle of Plassey. At length, the French withdrew from India, and in time, Britain won control of it.

In Canada, General James Wolfe captured Quebec from the French in 1759. In 1760, the British took Montreal. Later, all Canada became a British colony.

The Treaty of Paris, which ended the Seven Years' War in 1763, recognized Britain's gains. The first British Empire had reached its largest extent.

England after 1763. In the later 1700's, great economic and technological changes occurred. Historians have called this series of changes the Industrial Revolution. By 1830, Britain was changing from an agricultural to an industrial society. The Industrial Revolution saw the invention of power-driven machines dependent on coal. Industrial areas grew up around the coalfields of Clydeside, the Midlands, the North, and South Wales. Rapid industrial growth made Britain powerful.

Industrial development led to improved transport. Various important improvements in farming made it possible to clothe and feed Britain's rapidly rising population. But the industrial changes had serious social consequences. For many poor people, housing and working conditions were appalling. The use of machines caused many people to lose their jobs.

Fine art and literature. The late Georgian style of architecture became more graceful and simple. The greatest architects and designers were the Adam brothers. They also designed the interiors of their buildings, including furniture. Craftworkers who cooperated with them included Thomas Chippendale and George Hepplewhite. Georgian architecture reached a final purity of design in the *Regency* style of John Nash and others.

Portrait painting reached a high standard with Sir Joshua Reynolds and Thomas Gainsborough. Sir Thomas Lawrence painted portraits in the *romantic* style. Romanticism also influenced the landscapists John Constable and J. M. W. Turner. Poets of the romantic period included Lord Byron, John Keats, Percy Bysshe Shelley, and William Wordsworth. William Blake was both an artist and a poet. Novelists ranged from Jane Austen to Sir Walter Scott.

Sciences. Joseph Black discovered the latent heat of steam. William Murdock used coal gas for lighting. Henry Cavendish, Joseph Priestley, Michael Faraday, and others experimented in electricity. Edward Jenner vaccinated people against smallpox.

Religion. During the early 1700's, the Protestant clergy became less and less zealous in their duties. The decline of religion was halted by the Methodist movement led by John Wesley. The poor people in the new factory towns accepted his message eagerly. In the new Sunday schools, teachers instructed many poor children in Christianity and in reading and writing.

Agriculture. The period saw drastic changes in agriculture. Many wealthy merchants became landowners and wanted to live like country gentlemen and to make their farms successful. The rise in population and the

Bow Street magistrates courts tried people arrested by the police force called the *Bow Street runners.* This etching of the trial of a coachman was intended to ridicule the courts.

growth of towns increased the demand for food and made farming profitable. The efforts of the landlords to improve their estates led to what historians call the *Agrarian Revolution.*

A four-course rotation of crops replaced the traditional method of growing two cereal crops in successive years and leaving the land fallow in the third year. In the four-course rotation, four fields were used, and no land was left fallow. Farmers grew cereals in two successive years. In the third and fourth years, they grew turnips and then clover, both of which were used for winter animal fodder. After Jethro Tull's invention of a horse-drawn drill that sowed seed in rows, farmers gradually ceased to scatter seed by hand. Robert Bakewell and others improved selected breeds of sheep and cattle. Thomas Coke, Earl of Leicester, carried out improvements on his Norfolk farm that became famous.

The new farming methods could not be introduced where land was still divided into strips in three great open fields. By the early 1800's, most land was *enclosed.* When land was enclosed, farmers lost their small strips and received in exchange a plot of land that they had to enclose by a fence or hedge. Most large landowners wanted land enclosure, and they forced it upon small farmers by having Enclosure Acts passed in Parliament.

Travel in the early 1700's remained slow, difficult, and even dangerous. Few parishes kept roads in satisfactory repair, and no good new roads had been built since Roman times. People formed local companies or *turnpike trusts* to improve the roads. Through Acts of Parliament, they gained control over stretches of roads, upon which they set up barriers called *turnpikes.* At the turnpikes, they charged tolls on vehicles. This money was used to pay for road improvements. John McAdam invented a new method of making roads, now called *macadamizing.* Great roadbuilders of the time were Thomas Telford and John Metcalf.

Better roads meant faster travel. *Stagecoaches* ran regularly between important towns. From 1784, the Post Office used mailcoaches to provide regular and speedy transport for passengers and mail.

Owners of factories and mines found the system of transport they needed in canals, along which barges carried loads. In 1761, James Brindley built the first important canal, which linked coal mines at Worsley to Manchester. By the early 1800's, a network of canals covered Britain.

British engineers made many advances in other fields of civil engineering. Thomas Telford, the roadbuilder, also built bridges and aqueducts for canals. John Smeaton built the Eddystone Lighthouse, which stood for more than a hundred years.

Industrial development. The vast technological changes that brought the Industrial Revolution began in the early 1700's. Between 1709 and 1750, Abraham Darby and his son successfully smelted iron ore with coke rather than charcoal at their ironworks at Coalbrookdale, in Shropshire. After 1750, coke smelting became general, and the need for charcoal largely disappeared. The iron industry grew rapidly among the coalfields of the Midlands, northern England, South Wales, and southern Scotland. British iron production increased twelvefold in the 1700's and boosted demand for coal.

A steam-engine, invented by Thomas Newcomen in the early 1700's, was improved by James Watt. The new engine, harnessed to pumps, drew water out of deep mines. Watt and Matthew Boulton, a Birmingham businessman, formed a partnership to produce steam-engines. Watt's engine was very important for working machinery before the application of electric power. In 1815, Sir Humphry Davy invented a safety lamp for miners that gave light but would not ignite explosive gases.

The tremendous growth in iron production after 1750 was partly responsible for the production of machines. Machines were first used on a large scale in the cotton industry. In 1733, John Kay had invented the *flying shuttle,* which enabled weavers to double the speed of hand-weaving and to make wider cloth. In 1764, James Hargraves speeded the spinning of thread by inventing the *spinning jenny.* Richard Arkwright's *water frame* of 1769, Samuel Crompton's *spinning mule* of 1776, and Edmund Cartwright's *power loom* of 1785 were driven by water wheels.

When industrialists began to use machinery and steam power, they also started to establish factories. Many producers who had once worked at home began to work in cotton mills, ironworks, and potteries in such towns as Birmingham, Glasgow, and Manchester. In early factories, men, women, and children worked long hours in dangerous or unhealthy environments for low wages. Housing, sanitation, street lighting, and water supplies were inadequate. Yet the 1700's saw many social improvements with the spread of industry, and Britain's population increased.

Social changes. The Industrial and Agrarian revolutions raised Britain's wealth and living standards considerably. But the rapid changes also created social problems. The use of machines forced people out of work, and in the early 1800's, gangs of *Luddites* wrecked the machines that they claimed had robbed them of their jobs. Some workers formed trade unions as a means of opposing their masters. However, trade unions were forbidden by Combination Acts that remained in force until 1824. Despite the repeal of these Acts, six Dorset farmworkers who were trade unionists were convicted in 1834 of administering an unlawful oath to each other. These men, known as the *Tolpuddle Martyrs,* were *transported* (deported) to Australia.

In many country areas, the decline of the domestic system of industry brought hardship. To deal with rural poverty in Berkshire, the local justices of the peace met in 1795 at Speenhamland (now part of Newbury) and decided that a farmworker whose wages fell below a set level should receive an extra payment from the authorities out of rates. This raised the rates of farmers and landowners, who reacted by paying their workers low wages. The Speenhamland system was imitated throughout Britain, but because of it, many farm labourers became paupers. It was replaced in 1834 by the Poor Law Amendment Act.

Convicted criminals suffered terrible punishments, such as hanging, being locked in the stocks or pillory, or being strapped on a treadmill. In the 1820's, Sir Robert Peel reformed the penal code, and in 1829, he founded the London Metropolitan Police Force.

The rapid social changes of the period, made worse by an economic depression that hit Britain in 1815 after war with France, brought demands for radical social

An iron bridge built in Shropshire in 1779 stands as a monument to the huge expansion in Britain's iron output in the 1700's. It was the world's first bridge built entirely of iron.

reform. A reform meeting held at St. Peter's Field, Manchester, in 1819 was brutally suppressed by troops. Some people died, and the incident was called Peterloo, after the Battle of Waterloo.

But reforms did come. In 1829, Parliament passed a Catholic Emancipation Act, which freed Roman Catholics from many of the restrictions that they had lived under since the 1600's. In 1830, Earl Grey led a Whig government into office and began pushing through Parliament a measure to modernize the electoral system.

By 1830, the British electoral system was out of date. Few men had the right to vote. Voting took place openly at *hustings* (public platforms), and bribery or intimidation of voters was easy. Every county and every borough returned two members to Parliament. Some members of Parliament represented *rotten boroughs,* towns that had become greatly reduced in population. Others represented *pocket boroughs,* where one landowner controlled the votes. Few of the industrial towns in northern England and the Midlands were boroughs. Manchester, for example, had no member of Parliament, because it was not a borough.

The 1832 Reform Act was passed after a great struggle. Under the Act, most middle-class men received the vote. The Act abolished some small boroughs and reduced the number of members for other boroughs.

The Municipal Corporation Act of 1835 set up town councils elected by ratepayers and presided over by a mayor. It empowered boroughs to provide drainage, markets, street lights, and other facilities.

Overseas affairs after 1763. While all these changes were going on in Britain, political upheavals were taking place overseas. Several affected the British Empire.

Loss of the American Colonies. In 1763, Britain had 13 North American colonies in addition to Canada. Most American colonists were of British descent but had only weak ties with Britain. Communications between Britain and the colonies were slow and poor. The colonists inevitably evolved their own ways of life and wanted to manage their own affairs.

The British government claimed that its troops in North America protected the colonists from American Indian attacks. It insisted that the colonists should pay part of the cost of protection. In 1765, the British Parliament passed the Stamp Act to raise the required money by taxing the colonists. The colonists protested that there should be no taxation without representation in the British Parliament. The British government withdrew the stamp duty but still claimed its right to tax the colonies. The colonists denied this right and rebelled.

The American War of Independence, also called the American Revolution, began in 1775. The colonies issued a joint Declaration of Independence the next year. Britain lost the war and, in 1783, it recognized the independence of the colonies, which became the United States of America.

Canada. In 1791, the British government reorganized Canada into two provinces. The French settlements became *Lower Canada;* the English ones, *Upper Canada.*

India. British rule in India was extended and improved under the governors general Warren Hastings and the Marquess Wellesley, whose brother also served in India and later became the Duke of Wellington. In 1815, the Marquess of Hastings established British supremacy over Nepal, and in 1824, Lord Amherst began the annexation of Burma.

Ireland. In 1798, the Irish rebelled but were suppressed. By the Act of Union, William Pitt, Britain's prime minister, abolished the Irish Parliament and established the *United Kingdom of Great Britain and Ireland* in 1801. The Irish flag of St. Patrick was incorporated in the Union Flag.

France and Napoleon. Many people in Britain at first welcomed the French Revolution in 1789 as a triumph of liberty over tyranny. But by 1792, the British came to regard the new French government as aggressive and dangerous. The execution by the French of their king,

Iron-and-steel workshops, such as the one shown above at Newcastle Upon Tyne, grew up in Britain's large towns during the late 1700's and the 1800's.

Louis XVI, caused indignation in Britain. In 1793, Britain and France again went to war. The war continued after Napoleon Bonaparte took power in France in 1799, and it did not end until 1815. Through much of the war, Britain fought Napoleon's European empire alone.

In 1803, Napoleon planned to invade Britain. But Admiral Horatio Nelson, a great naval commander, defeated the French fleet at the Battle of Trafalgar in 1805. Napoleon next tried to defeat Britain by economic warfare. Under the *Continental System,* Napoleon tried to exclude British trade from the continent. However, Napoleon's blockade against Britain was not as effective as Britain's counterblockade against France and its allies. But British naval action resulted in the War of 1812 with the United States. Britain assisted a Spanish revolt against French rule in 1808. In 1815, Napoleon was finally defeated at the Battle of Waterloo by the Duke of Wellington and the Prussian commander Marshal Gebhard von Blücher.

Other overseas developments. Britain's statesmen took a prominent part in the peace settlement at the Congress of Vienna in 1815. Later, two successive foreign ministers, Lord Castlereagh and George Canning, opposed the efforts of the Austrian, Prussian, and Russian emperors to support despotic rule in other countries. The British government supported the Greeks in a war of independence against Turkey. Britain also promptly recognized the independence of several South American colonies that revolted against Spain in the early 1800's. These colonies included Argentina. But in 1833, a British fleet captured the Falkland Islands and expelled the Argentines who had settled there.

Although Britain lost America in 1783, it gained new territories abroad. Captain James Cook claimed part of Australia and New Zealand for Britain in 1770. In 1788, the British government began to send convicts to Australia. Free settlers arrived there later.

At the Vienna peace settlement of 1815, Britain obtained Guiana in northern South America, St. Lucia and Trinidad in the West Indies, Ceylon, Mauritius, the Cape of Good Hope, and Malta.

Some British merchants became wealthy by exporting black slaves from western Africa to the West Indies. During their voyages, the slaves were subjected to cruel conditions. A strong antislavery movement developed in Britain, led by William Wilberforce. Finally, in 1807, Parliament suppressed the slave trade. In 1833, it abolished slavery throughout the British Empire.

Years of progress (1837-1906)

During the long reign of Queen Victoria (1837-1901), the revolutionary changes that had transformed Britain from a mainly agricultural nation to an industrial one were followed by developments that took it further along the road of industrialism. These developments were mirrored by changes in Britain's social framework as the education of its people improved. Britain played an increasingly important international role, and its empire reached its widest extent.

Political developments. Many men who did not get the vote in 1832 resented the Reform Act and worked to change it. They drew up a charter demanding votes for all men, payment of members of Parliament, the abolition of the rule that members of Parliament must be property owners, the creation of electoral districts of roughly equal populations, and the annual election of parliaments. Members of the movement became known as *chartists.* The chartists held many demonstrations throughout Britain. A final, sensational demonstration in 1848 failed ridiculously. But most chartists were serious men, and all their demands—except for annually elected parliaments—have since been granted.

Important dates

1840	The penny post was established.
1844	The cooperative movement started at Rochdale.
1845-1846	Famine caused immense suffering in Ireland.
1851	London's Great Exhibition showed Britain's prosperity.
1856	Henry Bessemer produced steel by a new, efficient method.
1858	The British government took direct responsibility for India.
1859	Charles Darwin published *Origin of Species.*
1867	Parliament established the Dominion of Canada.
1867	Second Reform Act was passed by Parliament.
1870	An Education Act gave education to all children.
1879	Britain's first telephone company opened.
1899-1902	Britain fought the Boer War and annexed the Boer republics.

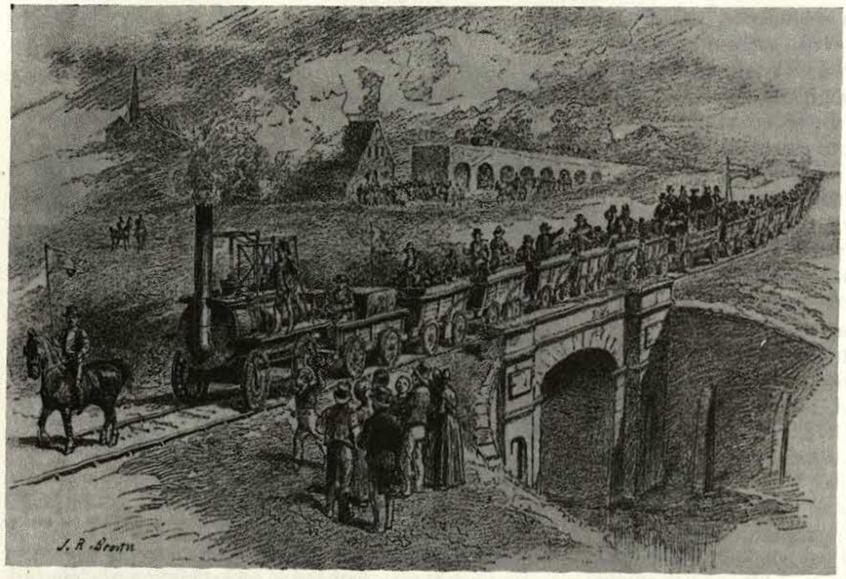
Further parliamentary reform came later in the 1800's. The Reform Act of 1867 extended the vote to working men in the towns. The Reform Act of 1884 gave the vote to agricultural labourers. Both these acts also redistributed parliamentary seats.

Social developments. In the mid-1800's, the continuing growth of the new industrial towns caused serious problems of health, housing, sanitation, and local administration. Many townspeople lived in crowded, badly built houses. Many died from disease. Few had suitable water supplies or drainage. Factory working hours remained long and wages low. Few safety precautions existed, and women and children were exploited. Farmworkers earned too little to feed their families.

Many reformers, notably Lord Shaftesbury, worked to improve conditions for poor people. Factory Acts passed between 1833 and 1853 reduced working hours for women and children, improved working conditions, and appointed factory inspectors. The Mines Act of 1842 forbade underground employment of women and girls and of boys under 10 years old.

Sir Edwin Chadwick had been largely responsible for the Poor Law Amendment Act of 1834 and became secretary of the Poor Law Board. He set up workhouses and abolished *outdoor relief,* such as the Speenhamland system, except to aged and sick people. But poor people hated his reforms. Able-bodied paupers lived in grim conditions in the workhouses, where husbands and wives were separated from each other.

In the mid-1800's, conditions for most people in Britain began to improve. The Great Exhibition, held in 1851, symbolized growing prosperity. Wages improved, and various Factory Acts reduced working hours. The Bank Holidays Act of 1871 gave workers a holiday on three Mondays in the year, as well as on Good Friday and Christmas Day. The music hall flourished as a popular form of entertainment, and annual seaside holidays became common. The Artisans' Dwellings Act of 1875 enabled town councils to destroy slums and erect new houses. City councils began to provide baths, libraries,



The world's first public steam railway opened in northern England on Sept. 27, 1825. George Stephenson's engine *Locomotion No. 1* pulled a train of coal and flour trucks, and a passenger coach, *Experiment*, from Darlington to Stockton.

lighting, parks, transport, and water. After 1888, county councils undertook similar improvements.

Developments in transport. In the 1830's, Britain had about 35,400 kilometres of reasonably good, mostly turnpike, roads and about 3,000 coach services in operation. At the same time, a system of canals covering more than 6,400 kilometres enabled inland towns, such as Manchester and Stoke-on-Trent, to export manufactured goods and obtain food and raw materials. But canal barges were slow.

A new form of transport, railways, soon began to rival coaches and canals. By 1803, John Blenkinsop, William Hedley, and Richard Trevithick had each invented a locomotive. George Stephenson and his son Robert built a prizewinning locomotive called *The Rocket*. In 1830, it became the first locomotive of the Liverpool and Manchester Railway. Railways developed rapidly. Engineers constructed the early lines in industrial areas, mainly for goods trains. They later built passenger lines. The importance of canals and coaches declined. In the 1840's, Britain's railways increased from 2,988 kilometres to over 9,600 kilometres.

Other engineers fitted steam-engines in ships. In 1802, William Symington built the first steamship to operate on the Clyde. Early steamers could not compete with the *Cutty Sark* and other fast sailing ships called *clippers*. But the use of iron or steel for the hulls of vessels and the invention of the screw propeller and steam turbine caused steamships gradually to replace sailing ships.

In 1861, the first horse-drawn tramways were laid down in London. Two years later, engineers built the first underground railway. London's first electric trams ran in 1883. In 1890, the world's first electrically driven underground railway opened in London. The bicycle was fully developed by 1889.

The motorcar had been developed in Germany in the late 1800's. By 1904, Britain had about 20,000 motorcars. London's first motorbuses and taxis appeared about 1905.

Developments in communication. The establishment in 1840 of the *penny post* revolutionized the ability of ordinary people to contact each other by letter. Britain's first telephone company opened in 1879.

Economic developments. As British industry grew, so did the population. By 1851, the population of Britain was nearly 28 million, and by 1901, nearly 42 million. In 1851, nearly half Britain's people lived in the country. By 1901, only a quarter did.

In the early 1800's, many influential people believed in a political and economic principle called *laissez faire*. This principle stated that the government should interfere as little as possible with trade and industry. The idea delayed the passing of education, factory, and health acts. Parliamentary supporters of laissez faire repealed the Navigation Acts in 1849 and backed Sir Robert Peel in abolishing customs duties in the 1840's.

Britain became a completely free-trade country with the repeal in 1846 of the *Corn Laws* (laws protecting British cereals against imported corn). Poor people hated

Many new products were developed during the 1800's, including a great number for the home. The above photograph, taken about 1900, shows some of the items that might have been seen in a working-class "model home."

the Corn Laws because the laws kept bread prices high. Landowners and farmers opposed repeal of the Corn Laws. But in 1845, the potato crop failed in Ireland, and there was a bad corn harvest in Britain. Faced with strong demands for cheap corn imports, Peel removed the Corn Laws.

In 1844, a group called the *Rochdale Equitable Pioneers* opened a cooperative store. The cooperative movement soon spread to other parts of Britain. Cooperative buying and selling cut living costs.

Repression of trade unions continued till the mid-1800's. But in 1851, skilled technicians formed the Amalgamated Society of Engineers. This union became large and successful, and other skilled workers established similar unions. Several trade unions associated to form the Trades Union Congress in 1868. The Trade Union Act of 1871 protected union funds. The Employers and Workmen Act of 1875 permitted peaceful picketing during strikes. The Trade Disputes Act of 1906 relieved unions of legal liability for damage caused by strikes.

Overseas developments. The dominant statesman in British foreign policy during the mid-1800's was Lord Palmerston. He upheld British interest and supported the cause of liberty and nationalism in other countries. He supported Belgian independence in 1830 and strongly protested to the European governments that suppressed liberal movements in 1848.

From 1854 to 1856, Britain and France fought Russia in the Crimean War. Britain feared that Russia would seize Turkish territory on the Mediterranean and threaten the British route to India. During the war, Florence Nightingale, a great English nurse, tended sick and wounded people. Her work revolutionized nursing care.

The colonies. In Canada, jealousies and suspicions between the two provinces established in 1791 led to revolts in both of them in 1837. Lord Durham, the British government's investigator, recommended that Canada should be reunited and made self-governing. The British North America Act of 1867 made Canada the first self-governing *dominion* within the British Empire.

In Australia, sheep farmers opened up the interior. Between 1849 and 1851, a gold rush attracted thousands of immigrants to Victoria and New South Wales. In 1900, the country became the *Commonwealth of Australia.*

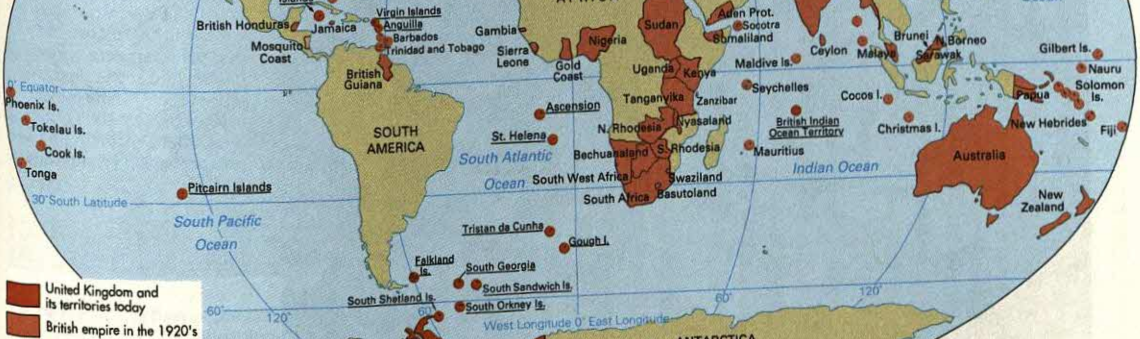
Britain annexed New Zealand in 1840. There, too, gold attracted immigrants, and New Zealand prospered as a farming country. It became a dominion in 1907.

In India, *sepoys* (soldiers) rebelled in 1857. The *Indian Revolt of 1857* had its causes in the religious practices of India's Hindus and Muslims. The British suppressed the revolt. But they abolished the rule of the East India Company, and brought India directly under the rule of the Crown. Queen Victoria became Empress of India in 1877.

In southern Africa, Britain had won the Cape of Good Hope from the Dutch by 1815. Many British emigrants had settled there and in Natal. Many of the *Boers* (Dutch settlers) moved into the interior. The largest such movement had been the *Great Trek* of 1836. The Boers founded two independent republics, the South African Republic (Transvaal) and the Orange Free State. In 1877, the British annexed the Transvaal, but the Boers won it back in the First Anglo-Boer War (1880-1881). In 1886, a gold rush in the Transvaal attracted many British prospectors. The Boers taxed them heavily and denied them the vote. Their grievances led to the Second Anglo-Boer War (1899-1902). Britain defeated the Boers and annexed the two republics. In 1910, the four territories of southern Africa formed the *Union of South Africa.*

Developments in government. From 1830 to 1841, with one short break, the Whigs formed the governments. The Tories opposed the Reform Act in 1832. But in 1835, Peel issued a document called the *Tamworth Manifesto,* which said that the Tory Party should com-

The British empire The British colonial empire spanned two eras. England held the American Colonies from the early 1600's until the 1770's. The other great colonial expansion was in the 1800's and the early 1900's. The map also shows those territories that remain British dependencies today.



bine reform with respect for tradition. The Tories began to call themselves *Conservatives.* In 1841, they won power under Peel. A later Conservative leader, Benjamin Disraeli, spoke of "Tory democracy," by which he meant that wealthy people should introduce social reforms to benefit poorer people. Disraeli pursued this policy in his terms as Conservative prime minister in 1868 and from 1874 to 1880.

Meanwhile, the aristocratic Whigs became, largely under the leadership of William Gladstone, the new *Liberal Party.* The Liberals represented particularly the middle classes and *Nonconformists* (Protestants outside the Church of England). In the late 1800's, the trade unions and a group of socialist intellectuals called the *Fabians* formed the *Labour Party.* The first Labour members entered Parliament in 1893. Socialists generally supported the Liberals, who won a great election victory in 1906.

In 1870, Gladstone's government reformed the Civil Service to make recruitment fairer. It also reformed the Army, which had long been badly administered.

The Irish question. Famine in 1845 greatly reduced Ireland's population. Many people starved or emigrated. The grievances of the Irish people were extremely bitter, and Gladstone determined to reform Irish administration. Acts were passed to end the special status of the Protestant Church of Ireland and to protect farmers against eviction by landlords. But these measures did not satisfy the Irish people, and Gladstone tried to give Ireland self-government. Parliament rejected his two Irish Home Rule Bills in 1886 and 1893. But Ireland's desire for self-government, voiced by a large *Irish Nationalist Party* in the British House of Commons, remained strong. See **Ireland, History of.**

Cultural developments. Culture declined from its Georgian elegance as the industrial middle classes replaced the landed aristocracy in importance. Soon, drab, brick towns, smoking factories, and ugly slag heaps covered large areas of Britain. In large buildings, architects sought to recreate past architectural styles, including *Gothic* and *Greek* or *Roman Classic.*

Popular Victorian painters included numerous artists, from Frederick Leighton to Sir Edwin Landseer. A group of painters, the *Pre-Raphaelite Brotherhood,* thought that pictures should be both beautiful and instructive. Musical composers included Sir Edward Elgar and Sir Hubert Parry. Great writers of the 1800's included Charlotte and Emily Brontë, Charles Dickens, George Eliot, Charles Kingsley, Anthony Trollope, and William Makepeace Thackeray. Thomas Hardy, Rudyard Kipling, George Bernard Shaw, and H. G. Wells lived on into the 1900's. Poets of the period included Matthew Arnold; Robert Browning; Elizabeth Barrett Browning; Algernon Charles Swinburne; and Alfred, Lord Tennyson.

In the later 1800's, new ideas caused discussion and controversy. Charles Darwin's *Origin of Species,* written in 1859, explained the development of all living creatures by a *theory of evolution.* Thomas Hughes, Charles Kingsley, and others voiced new ideas in the name of *Christian Socialism.*

Such literary and intellectual activity was aided by the growth of education. A state system of education began with the Elementary Education Act of 1870. The influence of Thomas Arnold, headmaster of Rugby School, led to the reform and growth of public and grammar schools. The Education Act of 1902 allowed local authorities to found secondary schools. In the 1800's, new universities were founded in Durham, London, and several industrial towns. With the spread of general education, a need arose for popular mass-circulation newspapers. These began with London's *Daily Mail* in 1896.

Industrial developments. British industry continued to expand. Coal output more than doubled between 1846 and 1862, and iron production increased by six times between 1833 and 1865. An expansion in trade as well as raw material production made Britain very prosperous and the world's leading manufacturing nation. It retained its industrial lead through the skill of its inventors. Sir Henry Bessemer discovered a less costly way of making steel, and steel replaced iron in engineering, railways, and shipbuilding. In 1844, Isambard Brunel laid

Music halls became immensely popular in Victorian England. Early music halls were drinking places. But gradually audiences grew bigger, and seating became more formal. Some music halls of the late 1800's, such as the Canterbury in South London, *left,* seated thousands.

the first electric telegraph on the Great Western Railway from Paddington to Slough. In 1866, British engineers laid the first telegraph cable across the Atlantic Ocean. In 1884, Sir Charles Parsons made the first practical steam turbine. In 1826, Patrick Bell invented a reaping machine for cutting cereals. He also devised a way of extracting sugar from sugar beet.

Near the end of the 1800's, Britain faced growing competition overseas. Such industrialized countries as France, Germany, and the United States protected their own manufactures against British goods by imposing high *tariffs* (taxes on imports). The United States and Germany overtook Britain in steel production. Britain's exports went into decline. Only coal, machinery, and ships maintained their share of the export market. Britain suffered an industrial slump between 1875 and 1896.

But British businessmen had invested money in the empire, South America, and other parts of the world. British companies owned overseas factories, farms, mines, and railways. The earnings of British shipping and insurance companies, and the profits of overseas investments provided a valuable income.

The United Kingdom in the 1900's

In the first half of the 1900's, Britain fought in two world wars that considerably changed its international influence and status. Many countries that before 1945 were British colonies became independent countries as the British Empire developed into the *Commonwealth of Nations.* In 1906, Britain was the world's richest and most powerful nation, but the Soviet Union and the United States, with their vast resources of people and materials, eventually overtook Britain.

Affairs in Parliament. In 1906, the Liberals won a general election by a large majority. The new government faced a mainly Conservative House of Lords, likely to reject its reforms. David Lloyd George, chancellor of the exchequer, wanted to challenge the Lords. But the House of Lords passed his first reform, the Old Age Pensions Act, in 1908. It granted a pension of 5 shillings (25 pence) a week to people over 70 years old.

In 1909, Lloyd George introduced a budget imposing extra taxes to pay for an expanded navy, old age pensions, and labour exchanges. It imposed *death duties* on estates worth more than 5,000 British pounds, a *supertax* on incomes over 5,000 British pounds a year, and a tax on land that had increased in value. The Lords rejected the budget.

Fashionable cyclists of the early 1900's often met in London's Hyde Park, *above.* This illustration also shows that elegance and good manners were important to society at that time.

Important dates

1911	The Parliament Act cut the power of the House of Lords.
1914	An Irish Home Rule Bill was passed but not put into effect.
1914-1918	Britain fought Germany and its allies in World War I.
1916	British forces crushed the Easter Rising in Ireland.
1921	The Irish Free State was set up.
1924	Ramsay MacDonald led the first Labour government.
1939-1945	Britain fought Germany and Japan in World War II.
1948	India and Pakistan became separate states.
1956	Britain and France attacked Egypt over the Suez Canal.
1957-1960's	Most British African territories became independent.
1972	Northern Ireland came under direct rule from Westminster.
1973	The United Kingdom (UK) joined the European Community (now called the European Union).
1979	Margaret Thatcher became the UK's first woman prime minister.
1982	British troops removed an Argentine invasion force from the Falkland Islands in the South Atlantic.
1991	British troops participated in the Persian Gulf War.
1994	A railway tunnel opened under the English Channel between England and France.

The Liberal Party was again returned to government in January 1910. It then introduced a bill to end the power of the Lords to reject financial bills. The bill also provided that any other bill, if passed by the Commons three times in two years, should become law without the approval of the Lords. The Liberals also proposed to reduce the length of a Parliament from seven to five years. The Lords resisted. But after the Liberals had won another election in December 1910, the Lords passed the bill. It became law as the Parliament Act of 1911.

The Liberals passed more social reforms. In 1911, the Shops Act enforced early closing once a week. By another act, members of Parliament received payment for their services. A National Insurance Act provided sickness insurance for all low-paid workers and unemployment insurance for people in some jobs.

World War I. In the late 1800's, Britain, with its vast empire, relied on the Navy for defences and followed a foreign policy of *splendid isolation.* But with the early 1900's came a need for alliances. In 1902, Britain allied with Japan to meet a possible Russian attack on India. In 1904, Britain and France, both fearing German aggression, signed a treaty called the *Entente Cordiale.* In 1907, this became the *Triple Entente,* when France's ally, Russia, joined. The Entente was opposed by the *Triple Alliance* of Germany, Austria, and Italy.

World War I began in 1914. The Allies—Britain, France, the United States, and other countries—fought the Central Powers—Germany, Austria-Hungary, the Ottoman Empire, and Bulgaria. The war was caused chiefly by political and economic rivalry among the various nations. Part of this rivalry was between Britain and Germany. German industry was growing rapidly, and Britain feared that German goods would flood the world market. Germany also had built a powerful navy.

Britain entered the war on Aug. 4, 1914, after German troops invaded neutral Belgium on their way to attack

France. The fighting lasted until 1918, when the Allies finally defeated Germany. See **World War I.**

Lloyd George served as prime minister during the second half of the war. He helped write the Treaty of Versailles, which officially ended the war with Germany. The treaty set up the League of Nations, and gave Britain control over German colonies in Africa. The Treaty of Sèvres, signed with the Turkish Ottoman Empire, gave Britain control over some Turkish possessions in the Middle East. See **League of Nations; Sèvres, Treaty of; Versailles, Treaty of.**

The war had a shattering effect on Britain. About 750,000 members of the British armed forces died. German submarines sank about 7 million metric tons of British shipping. The war also created severe economic problems for Britain and shook its position as a world power.

Irish affairs. From 1910, the Liberal government depended for its majority in the Commons on the Irish Nationalist Party led by John Redmond, who demanded self-government for Ireland. The Lords twice rejected the third Irish Home Rule Bill in 1913. Under the Parliament Act, the government could pass the bill in 1914. This they proposed to do.

But while Parliament delayed, the Irish situation became dangerous. Some Protestants in Ulster collected arms to resist any compulsion to be part of an independent Ireland. In March 1914, British Protestant officers stationed at the Curragh, near Dublin, had to be assured by the British government that they would not have to fight against Protestants in Ulster. The southern Irish then began arming. A conference of Conservative, Liberal, and Irish leaders failed to agree. Civil war in Ireland seemed inevitable. Then World War I began, and the government shelved the Home Rule Bill.

In 1916, a revolt called the *Easter Rebellion* broke out in Dublin. British soldiers quelled it, and the leaders were executed. *Sinn Féin,* a new republican party, won a general election in Ireland in 1918. It set up its own republican parliament, its own law courts, and an army, which attacked police officers and British soldiers. In reply, the British government in 1919 sent in the *Black and Tans,* a force of ex-soldiers. For 16 months, the two sides ruthlessly fought each other. In 1921, George V appealed for conciliation. Lloyd George proposed that southern Ireland should become the *Irish Free State,* with dominion status in the empire. The Irish delegates agreed and signed a treaty ending the war with Britain. Six counties in the province of Ulster remained part of the British kingdom, which was officially renamed the *United Kingdom of Great Britain and Northern Ireland.* The northern Irish set up a local parliament at Belfast.

The extreme Sinn Féiners rejected the treaty with Britain, and civil war followed in Ireland. The civil war ended in 1923 with victory for the protreaty party. In World War II, southern Ireland was neutral. In 1949, it became a republic outside the Commonwealth. See **Civil War, Irish; Ireland, History of.**

The rise of the Labour Party. In January 1924, a new party, the Labour Party, came to power under James Ramsay MacDonald. The party represented socialist societies and workers' groups. It began to develop in the late 1800's, and gathered strength through the years. While the Labour Party grew stronger, the Liberal Party declined. Many voters could see little difference between Conservatives and Liberals. They saw the Labour Party, with its socialist aims, as an alternative to the Conservative Party. The Labour Party held office only until November. It lacked a majority in the House of Commons, and needed the Liberal Party's support. The Liberals soon withdrew their support. The Conservatives, under Stanley Baldwin, then held control of the government until 1929.

In the 1929 elections, the Labour Party became the largest party for the first time. MacDonald returned as prime minister. A few months later, the worldwide Great Depression began. In 1931, MacDonald formed a government of Labour, Conservative, and Liberal leaders to deal with the emergency. The government increased taxes, abandoned free trade, and cut its own spending.

The General Strike of 1926 was beaten partly by military strength. Armoured cars protected convoys of lorries that carried food from London docks to Hyde Park for distribution.

Barrage balloons were used during World War II to protect areas against enemy air attacks. Barrage-balloon production, *left,* and other wartime jobs brought many women to employment for the first time.

But the United Kingdom could not escape the effects of the Great Depression.

Industrial affairs. For a short time after World War I, British industry prospered because of the worldwide shortage of manufactured goods. But in 1920, nearly 2 million workers became unemployed. The coal industry suffered badly as people began to use oil for fuel. Trade unions tried to win gains for their members in many industries. But employers refused concessions, and strikes followed.

A *General Strike* occurred in 1926, when miners—supported by the Trades Union Congress—struck against reduced wages. After nine days, the main strike ended. The miners remained on strike several months longer but finally had to accept the wage cuts.

The world economic situation deteriorated in the late 1920's. By 1932, the United Kingdom had about 3 million people unemployed. The industrial districts of northern England, Scotland, and South Wales became *distressed areas,* each with thousands of people out of work.

The world economic crisis gradually eased. Economic growth occurred mostly in London, southeastern England, and the western Midlands. In these areas, new industries produced aeroplanes, cars, radio and electrical equipment, and other items powered by oil and electricity. Working conditions and housing in these areas were better than in the old industrial regions. The population of most distressed areas declined.

"Peace in our time." In the depth of the depression, Adolf Hitler and his Nazi Party won control of Germany. Germany began to rearm, but few leaders in the United Kingdom, or elsewhere, saw the danger.

Meantime, the United Kingdom faced an unusual problem at home. King George V died in 1936, and his oldest son became King Edward VIII. Edward wanted to marry an American divorcée, Mrs. Wallis Warfield Simpson. The government, the Church of England, and many British people objected. Edward then gave up the throne to marry "the woman I love." His brother became king as George VI.

Neville Chamberlain, a Conservative, became prime minister in 1937. Chamberlain thought he could deal with Hitler. In 1938, Hitler seized Austria and then demanded part of Czechoslovakia. Chamberlain and Premier Édouard Daladier of France flew to Munich, Germany, to confer with Hitler. They gave in to Hitler's demands after the German dictator said he would seek no more territory (see **Munich Agreement**). Chamberlain returned to Britain and said: "I believe it is peace in our time." The people sighed in relief. But Chamberlain met sharp attacks in the House of Commons. Winston Churchill, a Conservative, called the Munich Agreement "a disaster of the first magnitude."

World War II. In March 1939, Germany seized the rest of Czechoslovakia. On September 1, Germany invaded Poland and World War II began. Two days later, the United Kingdom and France declared war on Germany. In April 1940, German troops invaded Denmark and Norway. Chamberlain resigned on May 10, and Churchill became prime minister. On that same day, Germany attacked Belgium, Luxembourg, and the Netherlands.

Churchill told the British people he had nothing to offer but "blood, toil, tears, and sweat" to win "victory at all costs. . . ." Germany conquered France in June, and the UK stood alone against the Nazi war machine.

The United Kingdom prepared for invasion, and Churchill urged his people to make this "their finest hour." He inspired them to heights of courage, unity, and sacrifice. Hundreds of German planes bombed the UK nightly. German submarines tried to cut the UK's lifeline by torpedoing ships bringing supplies to the island country. Severe rationing limited each person's share of food, clothing, coal, and oil. The British refused to be beaten, and Hitler gave up his invasion plans.

In June 1941, Germany invaded the Soviet Union. In

December, Japan attacked Pearl Harbor, in Hawaii, and the United States entered the war. The UK, the United States, the Soviet Union, and the other Allies finally defeated Germany and Japan in 1945. Near the end of the war, the UK helped establish the United Nations. For the story of the UK in World War II, see **World War II.**

About 360,000 British servicemen, servicewomen, and civilians died in the war. Great sections of London and other cities had been destroyed by bombs. The war had shattered the economy, and the UK had piled up huge debts. The United States and the Soviet Union came out of the war as the world's most powerful nations.

The welfare state. The Labour Party won a landslide victory in 1945. The party had campaigned on a socialist programme. Clement Attlee became prime minister, and the Labour Party stayed in power until 1951. During those six years, the UK became a *welfare state.* The nation's social security system was expanded to provide welfare for the people "from the cradle to the grave." The Labour government also began to *nationalize* industry by putting private businesses under public control. The nationalized industries included the Bank of England, the coal mines, the iron and steel industry, the railways, and the road haulage industry.

Although the Labour government struggled to restore the economy, conditions improved little. Rationing and other wartime controls continued. The government borrowed heavily from the United States.

Decline of the empire. World War II sealed the fate of the British Empire, though the UK had begun loosening control over its empire earlier. In 1931, the UK granted independence within the empire to Australia, Canada, the Irish Free State, New Zealand, Newfoundland, and South Africa. They became the first members of the *Commonwealth of Nations,* an association of countries and dependencies that succeeded the empire.

After World War II, the peoples of Africa and Asia increased their demands for independence. The UK could no longer keep control of its colonies. In 1947, India and Pakistan became independent nations within the Commonwealth. In 1948, Ceylon (now Sri Lanka) became an independent Commonwealth country. In that same year, Burma achieved independence—and left the Commonwealth. In 1949, the Republic of Ireland (Irish Free State) also left the Commonwealth, and Newfoundland became a province of Canada. South Africa was not a member of the Commonwealth from 1961 to 1994, because the UK had criticized its racial policies. Although blacks made up a majority of the population in South Africa, whites controlled the government. Also, the South African government had an official policy of racial segregation called *apartheid.* South Africa rejoined the Commonwealth when it ended its apartheid and gave blacks a full part in government.

Since the early 1950's, many more British possessions have become independent nations. They include Brunei, Cyprus, Ghana, Kenya, Malaysia, Malta, Nigeria, Papua New Guinea, Solomon Islands, Sudan, Trinidad and Tobago, and Uganda. In 1965, Rhodesia (now Zimbabwe) declared its independence from the UK. There, as in South Africa, whites controlled the government even though blacks made up a majority of the population. The UK had refused to grant Rhodesia independence until blacks were given a greater voice in the government. In 1980, after a long struggle for more power, blacks gained control of the Rhodesian government, and the UK recognized Rhodesia's independence. Rhodesia's name was changed to Zimbabwe. For details, see **Zimbabwe** (History). Generally, the British Empire has been disbanded in an orderly way, and most independent countries have stayed in the Commonwealth.

Prime ministers of the 1900's

Name	Party	Dates served
Marquess of Salisbury	Conservative	1895-1902
Arthur Balfour	Conservative	1902-1905
Sir Henry Campbell-Bannerman	Liberal	1905-1908
Herbert Asquith	Liberal	1908-1916
David Lloyd George	Liberal	1916-1922
Andrew Bonar Law	Conservative	1922-1923
Stanley Baldwin	Conservative	1923-1924
James Ramsay MacDonald	Labour	1924
Stanley Baldwin	Conservative	1924-1929
James Ramsay MacDonald	Labour	1929-1935
Stanley Baldwin	Conservative	1935-1937
Neville Chamberlain	Conservative	1937-1940
Winston Churchill	Conservative	1940-1945
Clement Attlee	Labour	1945-1951
Winston Churchill	Conservative	1951-1955
Sir Anthony Eden	Conservative	1955-1957
Harold Macmillan	Conservative	1957-1963
Sir Alexander Douglas-Home	Conservative	1963-1964
Harold Wilson	Labour	1964-1970
Edward Heath	Conservative	1970-1974
Harold Wilson	Labour	1974-1976
James Callaghan	Labour	1976-1979
Margaret Thatcher	Conservative	1979-1990
John Major	Conservative	1990-

Each prime minister has a biography in *World Book.*

While the UK was breaking up its empire during the postwar years, other nations of Western Europe joined together in various organizations to unite economically and politically. The UK was reluctant to join them. Throughout history, the UK had preferred to stay out of European affairs—except to keep the balance of power in Europe. By joining the new organizations, the UK feared it might lose some of its independence, and would also be turning its back on the Commonwealth.

In the 1950's, the UK refused to join the European Coal and Steel Community (ECSC) and the European Atomic Energy Community (Euratom). Most important, it did not join the European Economic Community (EEC), which eventually became the European Union (EU). This association, also called the European Common Market, was set up by France and five other nations. After the EEC showed signs of succeeding, the UK set up the European Free Trade Association (EFTA) with six other nations. But it was only a mild success, and the UK later regretted its refusal to join the EEC.

In the years after World War II, British foreign policy was closely allied with that of the United States. The UK joined the North Atlantic Treaty Organization (NATO) and fought in the Korean War (1950-1953).

In July 1956, Egypt seized the Suez Canal, which was owned mainly by the British and French. In October, Israel invaded Egypt, its enemy. The UK and France then attacked Egypt in an attempt to retake the canal. The attempt did not succeed. Pressure from the United States, the Soviet Union, and the United Nations forced the UK, France, and Israel to withdraw from Egypt.

Economic recovery—and collapse. A Conservative government had returned to power in 1951 under Winston Churchill. The Conservatives accepted most of the changes the Labour Party had made. By 1955, rationing and most other wartime controls had ended. Industry was thriving, jobs were plentiful, and wages were good. Churchill retired in 1955, and Sir Anthony Eden succeeded him as prime minister. Eden resigned in 1957, and Harold Macmillan succeeded him.

The economy continued to expand until the early 1960's. Hoping to improve the economy, the government applied for membership of the European Economic Community. By joining the EEC, Macmillan hoped the UK would be able to expand its export trade. But in January 1963, the UK's application was rejected, largely because of opposition from French President Charles de Gaulle. The rejection was a defeat for Macmillan. That year, the government was shaken by a scandal involving the secretary for war. The 1964 election brought the Labour Party back to power under Harold Wilson.

Wilson faced mounting economic problems. The UK was importing far more goods than it was exporting, and its industrial growth rate was too slow. The country's financial reserves shrank, and it had to borrow more and more money from other countries and international agencies. In 1966, the government began an *austerity* programme by increasing taxes and putting a ceiling on wages and prices. In October 1967, the UK was again rejected for membership of the EEC. In November, the government devalued the pound in response to the serious economic situation.

The United Kingdom today is seeking its new role in the world. UK society is also in a state of change. The old barriers between the classes were much reduced during World War II.

In the 1970 elections, the Conservative Party regained control of the government. Edward Heath became prime minister. In 1971, agreement was reached on terms for the UK's entry into the EEC. The UK joined the EEC in 1973. But continuing inflation, fuel shortages, strikes, and other matters caused serious problems for the Conservative government. Elections in 1974 brought the Labour Party back to power, and Harold Wilson again became prime minister. Wilson retired in 1976. James Callaghan succeeded him as prime minister and as leader of the Labour Party.

The Liberal Party briefly allied with a Labour administration in 1978. In 1982, the Liberals formed an electoral alliance with a new party carved out of the Labour Party's right wing. This was the Social Democratic Party. In 1987, the Liberals and Social Democrats agreed to terms for merging the two parties. In 1990, the new party was named the Liberal Democrats.

Long-standing conflicts between Catholics and Protestants in Northern Ireland became a serious problem during the late 1960's and the 1970's. In 1969, the government began sending troops to Northern Ireland to try to stop riots from occurring. But the violence continued. The unstable situation caused a series of political crises in Northern Ireland during the 1970's. The UK Parliament at Westminster established direct rule over the country at various times, while attempts were made to form a stable government in which Catholics and Protestants shared power. See **Northern Ireland** (History).

Some people in Scotland and Wales demand complete independence from the UK for their countries. Others believe Scotland and Wales should have their own legislatures to deal with laws that directly affect their countries. Still others favour no changes in the relations between Scotland and Wales and the rest of the UK. In March 1979, the UK government allowed the people of Scotland and Wales to vote on the question of whether they should have their own legislatures. The voters in both countries failed to approve the establishment of the legislatures. The process under which Scotland and Wales would have received more control over their affairs is called *devolution.*

Elections held in May 1979 returned the Conservatives to power. Conservative Party leader Margaret Thatcher replaced Callaghan as prime minister. She became the first woman ever to hold the office. As prime minister, Thatcher worked to reduce government involvement in the economy. For example, the government sold its interests in many industries to private citizens and businesses.

Since 1833, the UK has ruled the Falkland Islands, which lie about 515 kilometres east of the southern coast of Argentina. But Argentina has long claimed ownership of the islands. In April 1982, Argentine troops invaded and occupied the Falklands. British and Argentine forces fought for control of the Falkland Islands. The Argentine forces surrendered in June 1982.

In November 1990, Thatcher resigned as Conservative Party leader and prime minister. John Major succeeded her in both positions. In 1991, UK forces helped to liberate Kuwait in the Persian Gulf War.

In December 1993, Prime Minister John Major and Ireland's Prime Minister Albert Reynold's signed the *Anglo-Irish Joint Declaration on Northern Ireland* It led to an announcement by the IRA in August 1994 that they would cease their campaign of violence. In December of

HMS *Invincible* was part of the UK task force that drove Argentine invaders from the Falkland Islands in 1982. The crew were welcomed home as heroes when they returned.

that year, Sinn Féin President Gerry Adams met with representatives of the UK government to discuss further steps to peace. (See **Northern Ireland** [History]).

In 1994 France and the UK began to run passenger trains through the Channel Tunnel, and the UK continued to negotiate closer ties with the European Union.

Related articles in ***World Book*** include:

Biographies

Alban, Saint
Alfred the Great
Arthur, King
Bakewell, Robert
Ball, John
Charles (kings of England)
Coverdale, Miles
Cromwell, Oliver
Cromwell, Thomas
Disraeli, Benjamin
Edward (I, II, III, IV, V, VI, VII, VII of England)
Edward the Confessor
Elizabeth I
Fawkes, Guy
Gladstone, William Ewart
Glendower, Owen
Hengest and Horsa
Henry (kings of England)
Hereward the Wake
James (I, II of England)
Pym, John
Victoria (queen)
William (kings of England)

Other related articles

Angles
Anglo-Saxon Chronicle
Anglo-Saxons
Architecture
Ashdown, Battle of
Beowulf
Bible
Black Death
Bosworth Field
Bow Street runners
Bronze Age
Cabinet
Caerleon
Caledonia
Celts
Chartism
Civil War, English
Civil War, Irish
Commonwealth of Nations
Conservative Party
Counter Reformation
Court (History)
Covenanters
Crimean War
Crusades
Danegeld
Danelaw
Declaration of Independence
Defender of the Faith
Divine right of kings
Domesday Book
Druids
Enclosures
European Union
Factory acts
Feudalism
Fires of London
General Strike
Glen Coe
Great Famine
Great Plague
Guilds
Hadrian's Wall
Hastings, Battle of
Hundred Years' War
Ireland, History of
Iron Age
Jacobite risings
Jutes
Kings and queens of Britain and Ireland
Labour Party
Liberal Democrats
Local government
Long Parliament
Luddites
Magna Carta
Marches
Martello towers
Mercia
Middle Ages
Monastery
Norman Conquest
Normans
North Atlantic Treaty Organization
Northern Ireland (History)
Northumbria
Offa's Dyke
Orangemen
Parliament
Paston Letters
Peterloo
Pilgrimage of Grace
Poor laws
Popish Plot
Prayer Book
Prehistoric people
Presbyterians
Princes in the Tower
Puritans
Reformation
Renaissance
Rome, Ancient
Saxons
Scotland, History of
Settlement, Act of
Slavery
South Sea Bubble
Spanish Armada
Stamford Bridge, Battle of
Standard, Battle of the
Star Chamber
Stone Age
Stonehenge
Suffragettes
Tolpuddle martyrs
Trade unions
Union, Acts of
Vikings
Wales (History)
Wars of the Roses
Waterloo, Battle of
Wessex
Woolsack
World War I
World War II

Outline

I. Prehistoric Britain
- A. The earliest times
- B. The Palaeolithic Period
- C. The Mesolithic Period
- D. The Neolithic Period
- E. The Bronze Age
- F. The Iron Age
- G. First contact with Rome

II. Roman Britain (55 B.C.-A.D. 410)
- A. Caesar's expeditions
- B. The arrival of the Romans
- C. The rule of the Romans
- D. The departure of the Romans

III. The Dark Ages (410-1066)
- A. The Anglo-Saxon settlement
- B. Anglo-Saxon England
- C. Anglo-Saxon life
- D. Religion and early literature in England
- E. Viking raiders in Britain
- F. The Normans

IV. The Norman Conquest (1066-1337)
- A. Life under the Normans
- B. The Church
- C. The law

V. Years of conflict (1337-1485)
- A. The decline of feudalism
- B. The end of the medieval wars
- C. Religious developments
- D. The growth of trade
- E. The spread of learning

VI. Widening horizons (1485-1603)
- A. The early Tudors
- B. The English Reformation
- C. The Irish
- D. The later Tudors
- E. The Elizabethan Era
- F. The seamen

VII. Constitutional changes (1603-1714)
- A. The union of the kingdoms
- B. The king and Parliament
- C. The Commonwealth
- D. The Restoration
- E. The Glorious Revolution
- F. Overseas developments

VIII. Years of transition (1714-1837)
- A. England before 1763
- B. Overseas affairs before 1763
- C. England after 1763
- D. Overseas affairs after 1763

IX. Years of progress (1837-1906)
- A. Political developments
- B. Social developments
- C. Developments in transport
- D. Developments in communication
- E. Economic developments
- F. Overseas developments
- G. The colonies
- H. Developments in government
- I. The Irish question
- J. Cultural developments
- K. Industrial developments

X. The United Kingdom in the 1900's
- A. Affairs in Parliament
- B. World War I
- C. Irish affairs
- D. The rise of the Labour Party
- E. Industrial affairs
- F. "Peace in our time"
- G. World War II
- H. The welfare state
- I. Decline of the empire
- J. Economic recovery—and collapse
- K. The United Kingdom today

Questions

How did Queen Mary earn the nickname "Bloody Mary" in the mid-1500's?
To what did Prime Minister Neville Chamberlain refer when he said: "I believe it is peace in our time"?
What would *devolution* achieve for Scotland and Wales?
Who were the *Beaker Folk*?
Why was the period from 410 to 1066 called the *Dark Ages*?
On what basis did William, Duke of Normandy, lay claim to the English throne in 1066?
How did Britain lose its land link with the rest of Europe?
Why did England and France engage in the Hundred Years' War from 1337 to 1453?
What did the Act of Union, passed in 1707, achieve?
How did the government formed by Prime Minister James Ramsay MacDonald in 1931 respond to the Great Depression?

United Kingdom, Legal systems of the. There are separate legal systems for England and Wales, Scotland, and Northern Ireland. The system of courts in Northern Ireland is broadly the same as in England and Wales. But laws made by the UK parliament have effect in Northern Ireland only if they are specifically expressed to do so. Scotland, however, has a totally different legal structure because its laws have developed separately from the laws of England. Nevertheless, many statutes passed by the UK parliament have effect in Scotland. The reasons for these differences are historical (see **United Kingdom, History of the**).

In spite of their differences, all legal systems in the United Kingdom follow the same general principles to safeguard the rights of citizens whilst upholding the rule of law.

Basic rights of citizens

The Rule of Law means that the government must be carried on according to law. It also means that anyone who interferes with another person's freedom or property without legal authority is liable, whether he or she is a private citizen or a public official. Public officials cannot excuse themselves by saying that they were carrying out superior orders.

Fair trial. Every person has a right to a fair trial if accused of an offence. It is a fundamental principle of the common law that a person is presumed innocent until proved guilty (see **Common law**). In criminal trials, an accusation is not proved until it is established beyond a reasonable doubt. In serious criminal cases, a body of unbiased citizens called a *jury* decides whether a case is proved. The jury decides all questions of fact, and the judge decides questions of law. The jury must make its decision solely on the evidence before the court. Juries are not used in the trial of minor offences. Instead, magistrates decide whether the case is proved or not. In some cases, the accused may choose whether to be tried by a judge and jury or by magistrates. In civil cases, juries are seldom used. See **Jury; Trial.**

Every person is entitled to be represented in court by a lawyer. Defence lawyers aim to present their clients' cases in the best light and to make sure that they get a fair trial. Lawyers who think that their clients have not had a fair trial appeal on their clients' behalf to a higher court. Lawyers charge for their services. Persons accused of a crime, but who are unable to pay for a lawyer, can sometimes obtain free legal assistance. In civil cases, a person who cannot pay the normal professional fee can obtain legal assistance or advice either free or at a reduced cost for certain cases, according to his or her income. See **Legal aid.**

Personal freedom. Any restriction placed upon a person's freedom is unlawful unless it can be justified on some lawful ground. This is one of the basic principles of the common law. But the law recognizes some restrictions on freedom. Parents may exercise reasonable control over their children if they are under 18. Medical authorities may confine people certified to be of unsound mind to mental institutions. Courts may sentence people convicted of crimes or of contempt of court to periods of imprisonment.

The law allows a person to exercise a reasonable amount of force to assert his or her freedom. Also, if a person is wrongfully arrested, he or she may bring a civil action for damages for the wrong done or may start a criminal prosecution. But the most important instrument for the protection of personal freedom is the writ of *Habeas Corpus.* The writ may be served on anyone, including the home secretary, the governor of a prison, or the police. See **Habeas Corpus.**

Freedom of speech means that all people are free to speak, write, or print what they like, provided that they do not overstep the bounds set by law. If a person does overstep these bounds, he or she may commit the crimes of sedition, obscenity, blasphemy, or criminal libel, or the *torts* of libel or slander. See **Libel; Sedition; Slander; Tort.**

Freedom of assembly is the right to assemble peacefully for any lawful purpose. But this does not mean that people can hold a meeting anywhere they like. There is no right of public meeting on a highway, and most public places are subject to local bylaws. Also, the police have the power to direct the routes that processions must take.

Meetings are lawful only so long as they are peaceful. If a meeting ceases to be peaceful, the people at the meeting may commit the crime of *unlawful assembly.* If three or more people assemble together intending to use force for a common purpose they may become guilty of the crime of *riot,* and the authorities may use as much force as is necessary to disperse them.

Where United Kingdom laws come from

Courts in England, Wales, and Northern Ireland apply the rules of statute law, common law, and equity. Courts in Scotland apply Scots law. In addition, courts in all these countries apply the rules of international law where necessary, if they do not conflict with any statute (see **International law**).

Common law is the body of legal rules and principles that is based on the customs of the courts. Judges develop the rules of the common law by finding solutions to actual cases in court. They generally base their solutions on the previous decisions of judges in higher courts. These decisions are published in the various *law reports.* See **Common law; Law** (Common-law systems; The Middle Ages).

Equity is a body of rules that has grown up side by side with the common law. In the Middle Ages, people who could not obtain a remedy at common law turned to the lord chancellor for assistance. The lord chancellor, and later his assistants in the Court of Chancery, based their decisions on the principles of *equity* (moral justice). In time, these principles became fixed rules. The rules of equity are still separate from the rules of common law, but today people can obtain either kind of remedy in the same court. See **Equity.**

Statute law consists of acts passed by Parliament (see **Parliament**). In the United Kingdom, courts have no power to question the validity of any statute.

Parliament today is compelled to delegate authority to various other bodies because of pressure of work. For example, it permits the government to issue *Orders in Council* and ministers to make administrative regulations. It also permits local authorities, such as town councils, to make bylaws. The courts have power to investigate the validity of delegated legislation. If a court finds that an authority has exceeded its powers, or has not passed a law in the manner laid down by Parliament, it can declare that law invalid because it was made *ultra vires* (beyond its powers).

Scots law is a general term for all the laws that are recognized and applied by the Scottish courts. Courts in Scotland apply those statutes made by Parliament that are stated to apply to Scotland. They may also apply the acts passed by the Scottish Parliament before the Act of Union of 1707. Law courts in Scotland recognize the authority of certain Scottish writers on law. Scottish courts are also bound by the previous decisions of judges in the higher Scottish courts since the late 1500's. See **Scottish law.**

The legal profession

The legal profession in all parts of the United Kingdom is traditionally divided into *barristers* (*advocates* in Scotland) and *solicitors.* Barristers or advocates have the right to appear in all the superior courts of law, whereas solicitors spend most of their time advising clients and preparing legal documents, such as wills, conveyances, leases, and contracts. Barristers, however, prepare the documents called *pleadings* which state the client's claim or defence in court. Normally, a barrister deals with his client through a solicitor. Barristers wear wigs and gowns when they appear in court. Senior barristers with busy practices sometimes choose to "take silk" or become Queen's counsel (QC). This is known as taking silk because QC's wear silk gowns in court. A Queen's counsel usually specializes in a certain type of law and normally appears with a junior barrister. The QC is known as the *leader.* He no longer prepares pleadings and so can spend more of his time on advocacy and specialized advice.

Barristers in England and Wales are all members of one of the Inns of Court. The four inns are the Inner Temple, Middle Temple, Gray's Inn, and Lincoln's Inn. They are all situated in a small area of central London near the Law Courts. Each inn has its own hall, library, and other buildings. Most barristers' *chambers* (shared offices) are located in the inns. Before they can be *called to the bar* (become barristers), students must eat a certain number of dinners at their inn, as well as passing examinations. In order to practise at the bar, a barrister must work for one year as a *pupil* to an experienced barrister. Solicitors are all members of the Law Society, and must pass examinations as well as work for about two years for a qualified solicitor, known as working *articles of clerkship.*

See **Inns of Court; Lawyer; Solicitor.**

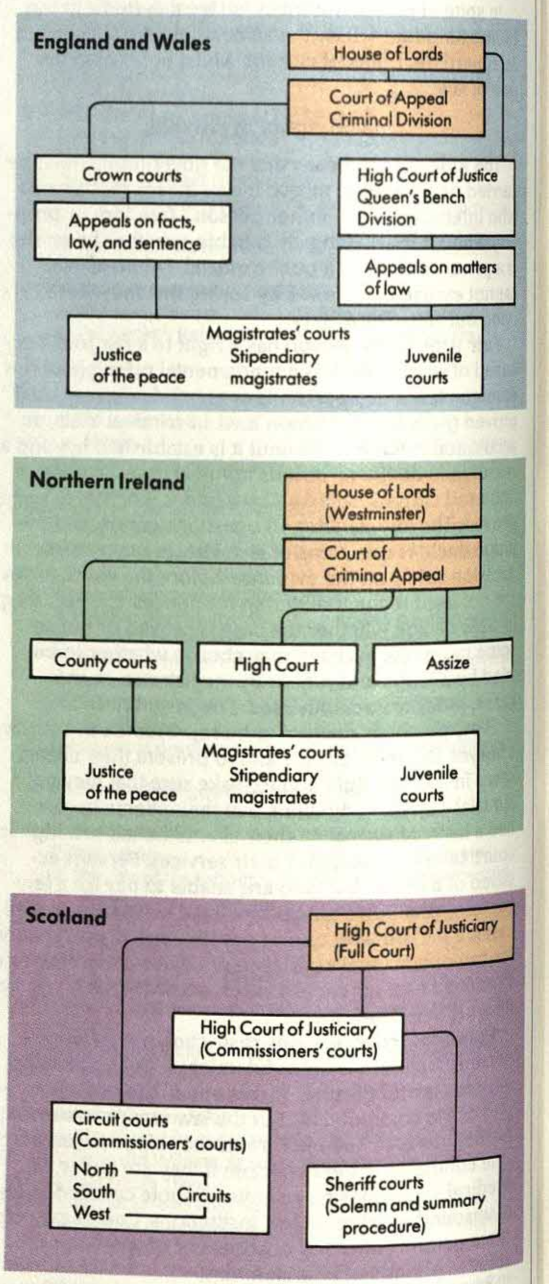
The courts system

Courts of law sit in cities and towns in all parts of the United Kingdom to discover the facts of legal disputes and to decide how to settle those disputes justly. To make sure that cases are tried justly, courts sit in public unless children or official secrets are involved. Some courts, called *criminal courts,* deal only with crimes. Others, called *civil courts,* deal only with civil wrongs. But many courts deal with cases involving either criminal or civil wrongs. See **Court; Crime.**

The court in which a case is first tried is called the *trial court* or the *court of first instance.* When a court is

Criminal courts in the United Kingdom

The diagrams below illustrate the three systems of criminal courts in the United Kingdom: those in England and Wales, in Northern Ireland, and in Scotland. Criminal courts deal only with crimes. In the diagrams, light orange boxes represent courts that sit only as appeal courts. Lines joining one court to another indicate possible lines of appeal from one court to a higher court.


England and Wales
House of Lords
Court of Appeal Criminal Division
Crown courts
Appeals on facts, law, and sentence
High Court of Justice Queen's Bench Division
Appeals on matters of law
Magistrates' courts
Justice of the peace
Stipendiary magistrates
Juvenile courts
Northern Ireland
House of Lords (Westminster)
Court of Criminal Appeal
County courts
High Court
Assize
Magistrates' courts
Justice of the peace
Stipendiary magistrates
Juvenile courts
Scotland
High Court of Justiciary (Full Court)
High Court of Justiciary (Commissioners' courts)
Circuit courts (Commissioners' courts)
North
South
West
Circuits
Sheriff courts (Solemn and summary procedure)

hearing an appeal, it is called an *appellate court* or *appeal court*. Courts in England, Wales, and Northern Ireland, apply the rules of statute law, common law, and equity. Courts in Scotland apply Scots law.

Minor crimes. In England and Wales, *justices of the peace* (JP's) or *magistrates* try most minor offences. The courts are called *magistrates' courts*. Three, four, or five justices sit in a court of petty sessions. Most justices are not trained lawyers. Generally, a legally trained official, called a *clerk*, is present at petty sessions. The clerk's job is to advise the justices on matters of law, procedure, and sentencing. Justices are not paid a salary for their work, but they are paid their expenses and an allowance for loss of earnings from their regular employment. See **Justice of the peace.**

In Northern Ireland, justices of the peace have only administrative powers. Minor offences are tried by *resident magistrates*.

In Scotland, *sheriffs* try most minor offences. The sheriffs are trained lawyers. See **Sheriff and bailiff.**

Big cities in Britain, such as Belfast, Glasgow, Liverpool, and London, have special magistrates' courts, each of which is staffed by a single magistrate who is a lawyer. The magistrates in these courts are called *stipendiary magistrates*, because, unlike justices of the peace, they receive *stipends* (salaries) for their work.

Serious crimes. All parts of the United Kingdom have a High Court whose jurisdiction includes trying serious crimes. In Scotland, the *High Court of Justiciary* tries only criminal cases. In England and Wales, the *High Court of Justice* has three divisions. The Queen's Bench Division supervises some criminal cases.

Judges of the High Court hear cases in the central courts in the various capital cities, and also in trial centres in the provinces. In England, Wales, and Northern Ireland, provincial courts were called *assizes* until 1971. Assizes in England and Wales were replaced by *crown courts*. Crown courts may be held at any place convenient to the court. The Old Bailey has the powers of a crown court for London (see **Old Bailey**).

Crown courts are held by High Court judges in some cases. In other cases, the courts are held by *circuit judges* or by *recorders*. Circuit judges are full-time judges who travel around the country. Recorders are experienced barristers or solicitors who serve as part-time judges. A judge of the crown court may be accompanied by a number of justices of the peace. Crown courts were set up in the Courts Act 1971. Previously, most serious criminal offences had been tried in *quarter sessions*, which were similar to crown courts.

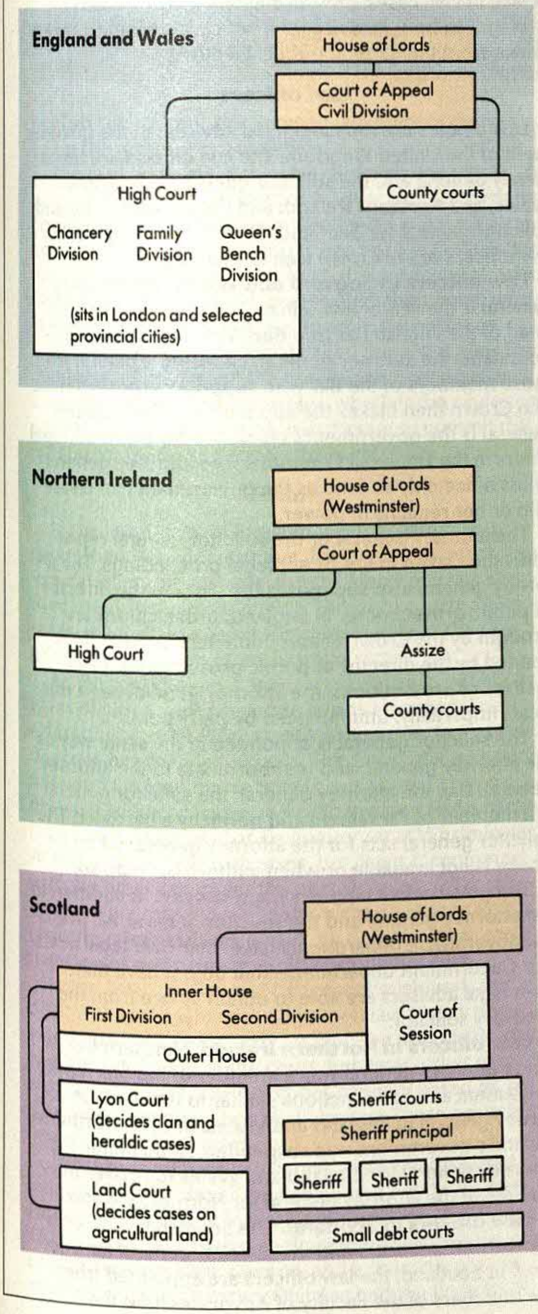
Offences by juveniles. *Juveniles* are boys and girls under 17. Crimes committed by juveniles are tried in special magistrates' courts called *juvenile courts* in England and Wales and *children's hearings* in Scotland. Juvenile courts have three justices, who must not all be of the same sex. Proceedings in juvenile courts are not open to the public.

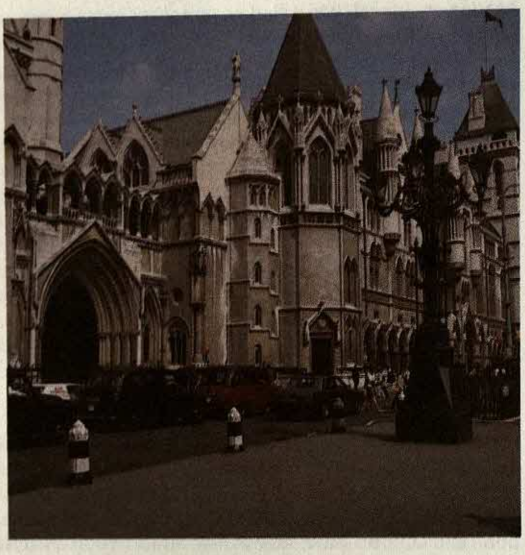
Criminal appeals. A person convicted in any criminal court generally has a right to appeal to a higher court. But a person who wishes to appeal on a matter of fact, rather than of law, may first have to obtain permission from the higher court.

Civil courts. In England, Wales, and Northern Ireland, county courts deal with small civil claims. In Scot-

Civil courts in the United Kingdom

The diagrams below illustrate the three systems of civil courts in the United Kingdom: those in England and Wales, in Northern Ireland, and in Scotland. Civil courts deal only with civil wrongs. In the diagrams, light orange boxes represent courts that sit only as appeal courts. Lines joining one court to another indicate possible lines of appeal from one court to a higher court.





The Royal Courts of Justice, in central London, are often called simply the *Law Courts.* More than 20 courts are located in the buildings.

land, the sheriff courts deal with such claims. County courts never use juries, but sheriff courts use them in important cases.

County and sheriff courts try cases with less delay than the higher courts, and with fewer formalities. Most chief towns have county courts or sheriff courts. Many people concerned in cases in these courts present their own facts and arguments without employing lawyers.

The High Courts in London and Belfast, or High Court judges sitting elsewhere, decide all cases of large claims for England, Wales, and Northern Ireland. Any division of the High Court in London may deal with civil cases. In Scotland, the *Outer House of the Court of Session* or the sheriff courts decide important civil cases. The Outer House has 14 judges called *lords ordinary.*

Civil appeals. Generally speaking, the losing side in a civil case has a right to appeal to some higher court on matters of law or fact. But appeals on matters of fact are permitted only if they involve considerable sums of money. In Northern Ireland and Scotland, special appeal courts hear only civil appeals.

Administrative tribunals. Various tribunals deal with administrative disputes. For example, people may go to *rent tribunals* to settle disputes about fair rents, or to *pension tribunals* to settle claims for government pensions. Some tribunals hold trials similar to those held in the ordinary courts. Others are more informal, and some conduct cases entirely by correspondence. People may have a right to appeal from the decisions of tribunals to other administrative bodies, or to appeal to the ordinary courts on points of law.

Advocates, judges, and juries. Either barristers or solicitors may represent the parties in cases in the lower courts, such as magistrates' courts or sheriff courts. In Scotland, some solicitors are called *law agents.* In the higher courts, only members of the Bar are entitled to act as advocates. The Scottish Bar is called the *Faculty of Advocates.* See **Bar; Solicitor.**

Judges in the higher courts are normally appointed from members of the Bar, or in Scotland from members of the Faculty of Advocates. Recorders and circuit judges may be appointed from solicitors.

In courts that have a judge and jury, the judge decides all points of law, and applies the rules of evidence and procedure. The judge also gives general guidance to the jury on matters of fact. In criminal cases, the judge decides what sentence to impose, within the limits laid down by acts of Parliament.

Juries take part in deciding the more serious criminal cases and in a few civil cases. Juries decide all questions of fact. In civil cases, they also estimate the amount of damages to be awarded to the winning side. Juries are drawn from the general public. See **Jury.**

Law officers

Law officers are the chief legal advisers to the government of the United Kingdom. The law officers are the attorney general and the solicitor general for England, Wales, and Northern Ireland, and the lord advocate and solicitor general for Scotland. Their full description is *law officers of the Crown* (see **Crown, The**).

Law officers in England and Wales. The attorney general is the senior law officer. He or she is also the head of the English Bar (see **Bar**). The prime minister nominates the attorney general, choosing a person from those members of the Bar who support the government. The Crown then makes the appointment. The attorney general is the government's chief spokesperson on legal affairs in the House of Commons. The attorney general holds office only so long as the government that chose him or her remains in power.

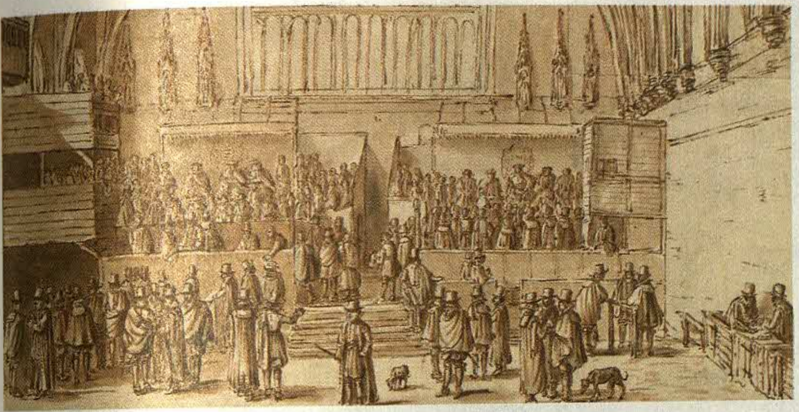
The attorney general or the solicitor general represents the Crown in important legal proceedings. The attorney general also supervises the work of the director of public prosecutions. In England, prosecutions are brought by the Crown Prosecution Service, which is headed by the director of public prosecutions. In all matters of prosecutions, the attorney general has a duty to act impartially, uninfluenced by party politics.

The solicitor general is appointed in the same way as the attorney general, and is subordinate to the attorney general. Like the attorney general, the solicitor general is a member of Parliament and normally a barrister. The solicitor general acts for the attorney general when he or she is not available or when authorized to do so.

The government employs many lawyers in addition to the attorney general and the solicitor general. All principal government departments have their own legal advisers. Government departments that do not have their own legal advisers are able to obtain advice from the Treasury solicitor.

Law officers in Northern Ireland. Northern Ireland's attorney general was a member of the Stormont Parliament and had functions similar to those of the attorney general in England and Wales. In 1972, Northern Ireland's government was suspended. At that time, the attorney general for England and Wales took over the powers of the attorney general for Northern Ireland.

Law officers in Scotland. The Scottish law officers are the *lord advocate* and the *solicitor general for Scotland.* In Scotland, the law officers are appointed from the members of the Faculty of Advocates. Like the



The courts of Chancery and King's Bench sat in Westminster Hall in the 1600's.

English law officers, the Scottish law officers change when the government changes.

The lord advocate is the chief Scottish law officer. He or she or a member of the Lord Advocate's Department conducts all prosecutions in Scotland. Unlike the attorney general of England, who is head of the English Bar, the lord advocate is not the head of the Faculty of Advocates. In Scotland, the advocates elect their head, who is called the *dean.* Both officers receive state salaries.

In Scotland, a legal official called the *procurator fiscal* conducts, in private, all the preliminary investigations into criminal cases to determine whether the evidence against the accused person is sufficient to commit the person for trial. See **Procurator fiscal.**

History

In the late 1000's, in England, each borough and county had its own court that decided cases according to local laws and customs. But the king's officials also tried cases in the royal courts. The royal courts decided cases according to a uniform system of law. They applied *common* (unwritten) law and statute law.

As the royal judges began to specialize in particular types of cases, three separate courts emerged. The *Court of Common Pleas* sat at Westminster to try civil disputes between individuals. The *Court of King's Bench* followed the king on his travels, supervised criminal justice, and tried civil cases in which the king had a particular interest. The *Court of Exchequer* sat at Westminster. At first, it dealt only with taxes, but, later, it competed with the other courts for the best share of civil cases. Judges from these three courts went on assizes to try civil and criminal cases locally. By doing so, they took many cases away from the old customary courts.

In the 1400's, a *Court of Chancery* developed, and dealt with cases where the common law courts provided no adequate remedy. At first, the lord chancellor was the sole judge of the court. But, later, other officials also sat as judges. The Court of Chancery based its decisions on principles of *equity* (fairness). These principles later became fixed rules.

The three common law courts were amalgamated into the Queen's Bench Division of the newly created High Court of Justice by the Judicature Acts of 1873 and 1875. The same acts also abolished the separate courts of chancery, probate, divorce, and admiralty, and created instead the Chancery Division and the Probate, Divorce, and Admiralty (PDA) Division of the High Court (see **Probate**). In 1907, Parliament created a Court of Criminal Appeal. In 1966, a new act abolished this court, and instead enlarged the Court of Appeal to include a Criminal Division. In 1971, the PDA was abolished and its jurisdiction divided among a new Family Division and the two older divisions.

In the 1500's, a court organization was established in Ireland similar to the organization in England. The organization in Northern Ireland is still similar to that in England and Wales. Northern Ireland forms one circuit. The Republic of Ireland established its own separate system of courts in 1961.

In Scotland, the Court of Session was formally established in 1532, and the High Court of Justiciary in 1672. The sheriff courts date back to the Middle Ages. Since the Act of Union between Scotland and England in 1707, civil appeals from the Court of Session can go to the House of Lords.

Related articles in *World Book* include:

Bar
Civil law
Common law
Coroner
Court
Crime
Equity
Habeas Corpus
Jury
Justice of the peace
Law
Lawyer
Legal aid
Old Bailey
Police
Procurator fiscal
Scottish law
Sheriff and bailiff
Star Chamber
Trial

Outline

- **I. Basic rights of citizens**
  - A. Fair trial
  - B. Personal freedom
  - C. Freedom of speech
  - D. Freedom of assembly
- **II. Where United Kingdom laws come from**
  - A. Common law
  - B. Equity
  - C. Statute law
  - D. Scots law
- **III. The legal profession**
- **IV. The courts system**
  - A. Minor crimes
  - B. Serious crimes
  - C. Offences by juveniles
  - D. Criminal appeals
  - E. Civil courts
  - F. Civil appeals
  - G. Administrative tribunals
  - H. Advocates, judges, and juries
- **V. Law officers**
  - A. Law officers in England and Wales
  - B. Law officers in Northern Ireland
  - C. Law officers in Scotland
- **VI. History**

United Nations headquarters consists of several buildings along the East River in New York City. The tall Secretariat Building, *centre,* has become a well-known symbol of the UN. Other UN buildings include the General Assembly Building, *left,* and the Dag Hammarskjöld Library, *right.*

United Nations

United Nations (UN) is an organization of nations that works for world peace and security and the betterment of humanity. Almost all of the world's independent countries belong to the UN. Each member nation sends representatives to UN headquarters in New York City, where they discuss and try to solve problems.

The United Nations has two main goals: peace and human dignity. If fighting between two or more countries breaks out anywhere, the UN may be asked to try to stop it. After the fighting stops, the UN may help work out ways to keep it from starting again. But the UN tries above all to deal with problems and disputes before they lead to fighting. It seeks the causes of war and tries to find ways to eliminate them.

The United Nations has met with both success and failure in its work. It has been able to keep some disputes from developing into major wars. The organization has also helped people in numerous parts of the world gain their freedom and better their way of life. For many years, however, disagreements among UN member nations prevented the organization from operating effectively. Since the mid-1980's, greater cooperation among members has enabled the UN to carry out successful missions in more and more countries. But these missions have added to the serious financial troubles that have long plagued the UN.

The United Nations was established on Oct. 24, 1945, shortly after World War II. As the war drew to an end, the nations that opposed Germany, Italy, and Japan decided that such a war must never happen again. Representatives of these nations met in San Francisco in April 1945 and worked out a plan for an organization to help keep peace in the world. This plan was described in a document called the *Charter of the United Nations.* In June 1945, 50 nations signed the UN Charter. They were the first UN members. Since then, more than 100 other nations have joined.

In some ways, the UN resembles the League of Nations, which was organized after World War I (see **League of Nations**). Many of the nations that founded the UN had also founded the League. Like the League, the UN was established to help keep peace between nations. The main organs of the UN are much like those of the League. But the UN differs from the League in two main ways. First, all the great military powers except Communist China were UN members from the beginning, and Communist China gained membership in 1971. On the other hand, several powerful countries, including the United States, either did not join the League or withdrew from it. Second, the UN's concern with economic and social problems gives it broader responsibilities than the League had.

The six major organs of the UN carry on the work of the organization. These organs are (1) General Assembly, (2) Security Council, (3) Secretariat, (4) Economic and

Social Council, (5) International Court of Justice, and (6) Trusteeship Council. Various specialized agencies related to the UN deal with particular problems such as communications, education, food and agriculture, health, and labour.

UN headquarters consists of several buildings along the East River in New York City. The three main buildings are the General Assembly Building, the Secretariat Building, and the Conference Building. A smaller building next to the Secretariat Building houses the library. Member countries have donated many furnishings and works of art for the UN buildings. The flags of all the member nations fly in front of the UN headquarters.

The United Nations flag has a map of the world surrounded by a wreath of olive branches. The branches symbolize peace.

Members of the United Nations

The UN has 184 members. In this table, charter members of the UN do not have dates after their names. Other nations are listed with the years they became UN members.

Afghanistan (1946)
Albania (1955)
Algeria (1962)
Andorra (1993)
Angola (1976)
Antigua and Barbuda (1981)
Argentina
Armenia (1992)
Australia
Austria (1955)
Azerbaijan (1992)
Bahamas (1973)
Bahrain (1971)
Bangladesh (1974)
Barbados (1966)
Belarus*
Belgium
Belize (1981)
Benin (1960)
Bhutan (1971)
Bolivia
Bosnia-Herzegovina (1992)
Botswana (1966)
Brazil
Brunei (1984)
Bulgaria (1955)
Burkina Faso (1960)
Burma (1948)
Burundi (1962)
Cambodia (1955)
Cameroon (1960)
Canada
Cape Verde (1975)
Central African Republic (1960)
Chad (1960)
Chile
China†
Colombia
Comoros (1975)
Congo (1960)
Costa Rica
Croatia (1992)
Cuba
Cyprus (1960)
Czech Republic (1993)
Denmark
Djibouti (1977)
Dominica (1978)
Dominican Republic
Ecuador
Egypt
El Salvador
Equatorial Guinea (1968)
Eritrea (1993)
Estonia (1991)
Ethiopia
Fiji (1970)
Finland (1955)
France
Gabon (1960)
Gambia (1965)
Georgia (1992)
Germany (1973)‡
Ghana (1957)
Greece
Grenada (1974)
Guatemala
Guinea (1958)
Guinea-Bissau (1974)
Guyana (1966)
Haiti
Honduras
Hungary (1955)
Iceland (1946)
India
Indonesia (1950)
Iran
Iraq
Ireland (1955)
Israel (1949)
Italy (1955)
Ivory Coast (1960)
Jamaica (1962)
Japan (1956)
Jordan (1955)
Kazakhstan (1992)
Kenya (1963)
Korea, North (1991)
Korea, South (1991)
Kuwait (1963)
Kyrgyzstan (1992)
Laos (1955)
Latvia (1991)
Lebanon
Lesotho (1966)
Liberia
Libya (1955)
Liechtenstein (1990)
Lithuania (1991)
Luxembourg
Macedonia (1993)§
Madagascar (1960)
Malawi (1964)
Malaysia (1957)
Maldives (1965)
Mali (1960)
Malta (1964)
Marshall Islands (1991)
Mauritania (1961)
Mauritius (1968)
Mexico
Micronesia, Federated States of (1991)
Moldova (1992)
Monaco (1993)
Mongolia (1961)
Morocco (1956)
Mozambique (1975)
Namibia (1990)
Nepal (1955)
Netherlands
New Zealand
Nicaragua
Niger (1960)
Nigeria (1960)
Norway
Oman (1971)
Pakistan (1947)
Panama
Papua New Guinea (1975)
Paraguay
Peru
Philippines
Poland
Portugal (1955)
Qatar (1971)
Romania (1955)
Russia #
Rwanda (1962)
St. Christopher and Nevis (1983)
St. Lucia (1979)
St. Vincent and the Grenadines (1980)
San Marino (1992)
São Tomé and Príncipe (1975)
Saudi Arabia
Senegal (1960)
Seychelles (1976)
Sierra Leone (1961)
Singapore (1965)
Slovakia (1993)
Slovenia (1992)
Solomon Islands (1978)
Somalia (1960)
South Africa
Spain (1955)
Sri Lanka (1955)
Sudan (1956)
Suriname (1975)
Swaziland (1968)
Sweden (1946)
Syria
Tajikistan (1992)
Tanzania (1961)
Thailand (1946)
Togo (1960)
Trinidad and Tobago (1962)
Tunisia (1956)
Turkey
Turkmenistan (1992)
Uganda (1962)
Ukraine**
United Arab Emirates (1971)
United Kingdom
United States
Uruguay
Uzbekistan (1992)
Vanuatu (1981)
Venezuela
Vietnam (1977)
Western Samoa (1976)
Yemen (1990)††
Yugoslavia
Zaire (1960)
Zambia (1964)
Zimbabwe (1980)

---

*Called the Byelorussian Soviet Socialist Republic until 1991.
†Nationalist China (Taiwan) held a seat in the UN until October 1971, when the General Assembly voted to expel Nationalist China and admit Communist China.
‡East Germany and West Germany each held seats from 1973 until 1990, when German unification occurred.
§The former Yugoslav republic.
#Assumed the seat of the Union of Soviet Socialist Republics (U.S.S.R) when that country was dissolved in 1991. The U.S.S.R. was a charter member of the UN.
**Called the Ukrainian Soviet Socialist Republic until 1991.
††In 1990, Yemen (Sana), which became a member in 1947, and Yemen (Aden), a member since 1967, merged to form Yemen.
Source: United Nations

The Charter

The Charter of the United Nations is the constitution of the UN. It includes the plan used for organizing the UN, and the rules by which the UN is governed. UN members agree to carry out the requirements of the charter. The charter has 19 chapters divided into 111 articles that explain the *purposes* (goals), *principles* (basic beliefs), and operating methods of the UN.

Purposes and principles. The charter lists four purposes and seven principles of the United Nations. The first purpose is to preserve world peace and security. The second purpose is to encourage nations to be just in their actions toward each other. The third is to help nations cooperate in trying to solve their problems. The fourth purpose is to serve as an agency through which nations can work toward these goals.

The first principle of the United Nations is that all members have equal rights. Second, all members are expected to carry out their duties under the charter. Third, they agree to the principle of settling their disputes peacefully. Fourth, they agree not to use force or the threat of force against other nations, except in self-defence. Fifth, members agree to help the UN in every action it takes to carry out the purposes of the charter. Sixth, the UN agrees to act on the principle that non-member states have the same duties as member states to preserve world peace and security. And seventh, the UN accepts the principle of not interfering in the actions of a member nation within its own borders. But these actions must not hurt other nations.

Membership requirements. The first members of the United Nations were the nations that signed the charter in 1945. Since then, many other nations have requested to join the organization. The charter states that membership in the UN is open to all "peace-loving states" that are "able and willing" to carry out the duties required by the charter. Both the Security Council and the General Assembly must approve applications for membership. A member nation that violates the charter may be suspended or even expelled from the UN.

The six major UN organs. The charter sets up the six main organs of the UN and explains the duties, powers, and operating methods of each. The *General Assembly* is the only major organ in which all UN members are represented. The charter permits the Assembly to discuss any question of importance to the UN and to recommend action to be taken by the members or by other UN organs. The *Security Council* has the major responsibility in the UN for keeping the peace. The charter gives the Council special powers to carry out this responsibility. The *Secretariat* has the job of helping all the other organs do their work as efficiently as possible. The charter gives the *Economic and Social Council* several duties, such as advancing human rights and helping people to better their way of life. The *International Court of Justice* handles international legal disputes. The charter established the *Trusteeship Council* to watch over a number of territories that were not self-governing at the time the UN was founded.

The United Nations has established many other agencies, committees, and commissions since the charter was written. But the six main organs are the only UN bodies that operate under rules that are included in the charter.

Amending the charter. The UN charter sets forth the rules for changing the charter. Amendments may be proposed in either of two ways. The General Assembly may propose an amendment if two-thirds of all its members agree to do so. Or two-thirds of the General Assembly members and any nine members of the Security Council may call a *General Conference* to discuss making changes in the charter. As in the General Assembly, a two-thirds vote of a General Conference is required to propose an amendment. A proposed amendment does not go into effect until it has been approved by two-thirds of all members of the United Nations, including the five permanent members of the Security Council. In 1965, the charter was amended to increase the number of members of the Security Council from 11 to 15. The amendment was proposed without calling a General Conference.

The charter called for the 10th yearly session of the General Assembly to make plans for a General Conference if one had not already taken place. In 1955, the Assembly took up the question and appointed a planning

The preamble to the Charter of the United Nations

A preamble of about 200 words precedes the chapters of the charter and expresses the guiding spirit of the organization. Jan Christiaan Smuts of South Africa is credited with drafting the preamble (see **Smuts, Jan C.**). The complete preamble states:

"We the peoples of the United Nations determined

to save succeeding generations from the scourge of war, which twice in our lifetime has brought untold sorrow to mankind, and

to reaffirm faith in fundamental human rights, in the dignity and worth of the human person, in the equal rights of men and women and of nations large and small, and

to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and

to promote social progress and better standards of life in larger freedom,

and for these ends

to practise tolerance and live together in peace with one another as good neighbours, and

to unite our strength to maintain international peace and security, and

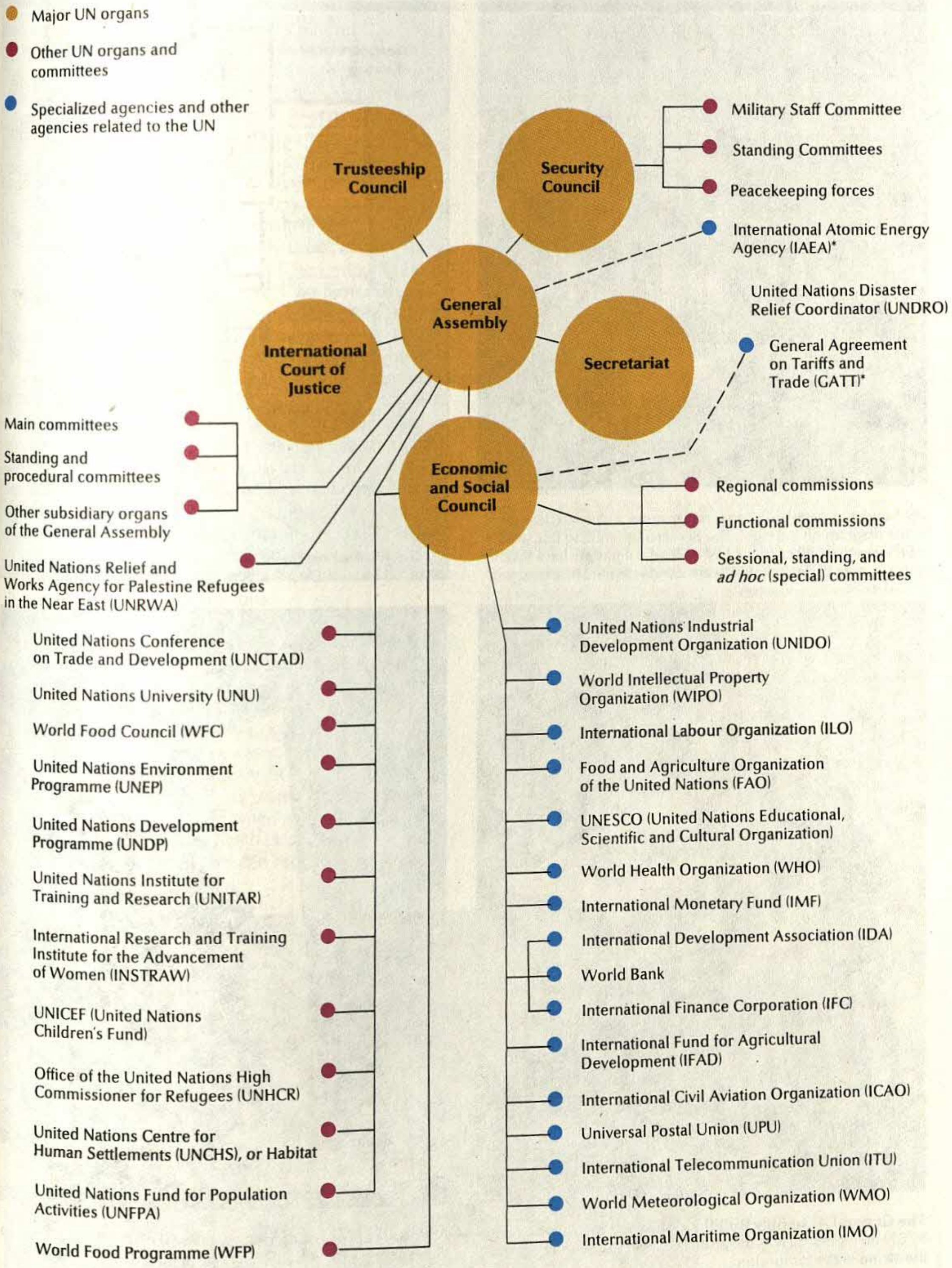
to ensure, by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and

to employ international machinery for the promotion of the economic and social advancement of all peoples,

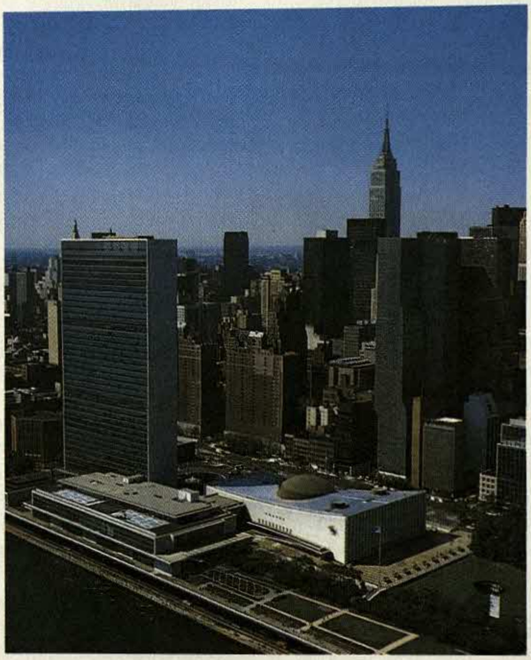
have resolved to combine our efforts to accomplish these aims.

Accordingly, our respective Governments, through representatives assembled in the city of San Francisco, who have exhibited their full powers found to be in good and due form, have agreed to the present Charter of the United Nations and do hereby establish an international organization to be known as the United Nations."

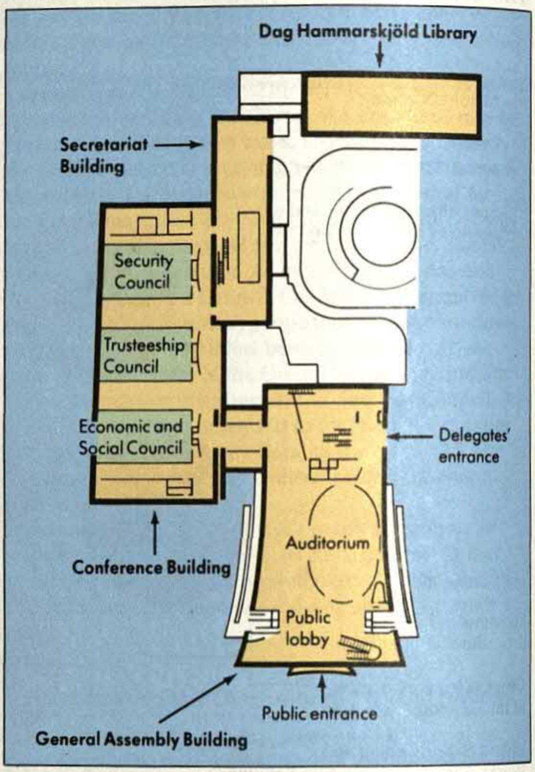
The United Nations system

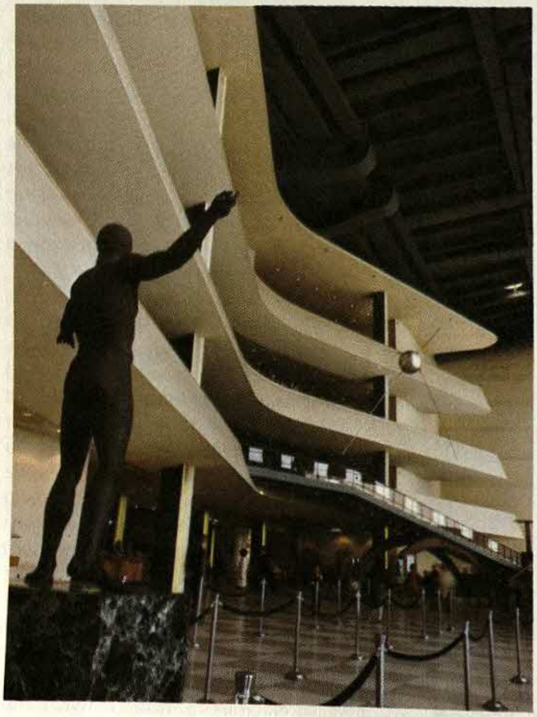

● Major UN organs
● Other UN organs and committees
● Specialized agencies and other agencies related to the UN
Trusteeship Council
Security Council
General Assembly
International Court of Justice
Secretariat
Economic and Social Council
Military Staff Committee
Standing Committees
Peacekeeping forces
International Atomic Energy Agency (IAEA)*
United Nations Disaster Relief Coordinator (UNDRO)
General Agreement on Tariffs and Trade (GATT)*
Main committees
Standing and procedural committees
Other subsidiary organs of the General Assembly
United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA)
Regional commissions
Functional commissions
Sessional, standing, and *ad hoc* (special) committees
United Nations Conference on Trade and Development (UNCTAD)
United Nations University (UNU)
World Food Council (WFC)
United Nations Environment Programme (UNEP)
United Nations Development Programme (UNDP)
United Nations Institute for Training and Research (UNITAR)
International Research and Training Institute for the Advancement of Women (INSTRAW)
UNICEF (United Nations Children's Fund)
Office of the United Nations High Commissioner for Refugees (UNHCR)
United Nations Centre for Human Settlements (UNCHS), or Habitat
United Nations Fund for Population Activities (UNFPA)
World Food Programme (WFP)
United Nations Industrial Development Organization (UNIDO)
World Intellectual Property Organization (WIPO)
International Labour Organization (ILO)
Food and Agriculture Organization of the United Nations (FAO)
UNESCO (United Nations Educational, Scientific and Cultural Organization)
World Health Organization (WHO)
International Monetary Fund (IMF)
International Development Association (IDA)
World Bank
International Finance Corporation (IFC)
International Fund for Agricultural Development (IFAD)
International Civil Aviation Organization (ICAO)
Universal Postal Union (UPU)
International Telecommunication Union (ITU)
World Meteorological Organization (WMO)
International Maritime Organization (IMO)

*GATT and IAEA have no formal relationship with the UN but cooperate with it and are considered part of the UN system.

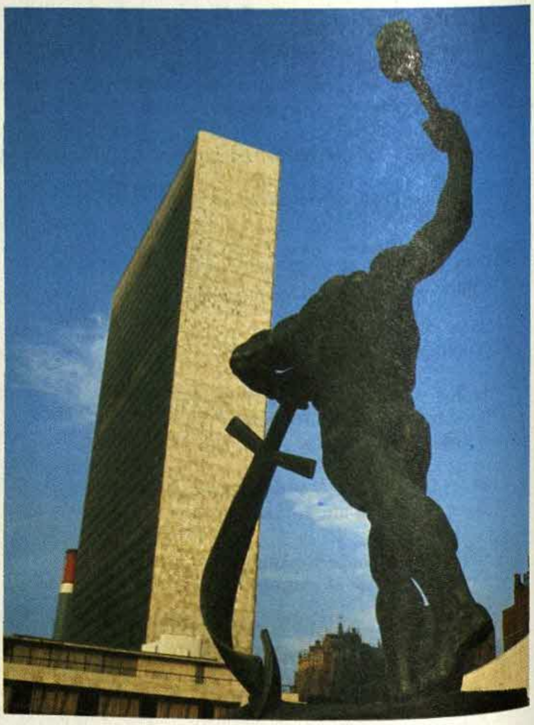


UN headquarters buildings, *foreground above,* are identified in the diagram on the right. The Secretariat Building houses the administrative offices of the UN. Millions of people have taken guided tours of the UN, which are conducted in 20 languages.





The General Assembly Building lobby has displays donated by UN members such as the artificial satellite, *centre right,* and the statue in the foreground.



A statue representing peace, called "Let Us Beat Swords into Plowshares," expresses the UN's main goal. The title is a quotation from Isaiah 2:4 in the Old Testament of the Bible.

committee. The committee has met from time to time and has reported to the General Assembly. But the Assembly has taken no further action.

The General Assembly

The General Assembly is the only major organ of the United Nations in which all members are represented. Each member may send five delegates, five alternate delegates, and as many advisers as it wishes. However, each member nation has only one vote.

The General Assembly elects a new president and a number of vice presidents at the beginning of each annual session. The president's main duty is to lead the Assembly's discussions and direct its work.

Powers. The General Assembly is responsible in some way for every other organ of the United Nations. It elects or takes part in electing the members of the other major organs, and it directs the operations of some UN bodies. The General Assembly also controls the UN's budget. It decides how much money each member should contribute and how much of the UN's funds each UN body should receive.

The General Assembly may discuss any question that concerns the work of the UN. It reaches decisions through a vote of its members. As a result of such a vote, the Assembly may suggest actions to be taken by other UN bodies or by member nations. According to the charter, the only decisions of the General Assembly that UN members must obey are votes on the UN budget. All other decisions made by the General Assembly are simply recommendations.

The General Assembly's responsibility for keeping the peace is second only to the similar responsibility of the Security Council. The kind of peacekeeping action that the Assembly can take has been strengthened since the charter was written. In the early years of the UN, sharp disagreements in the Security Council prevented the Council from acting in many cases. In 1950, the General Assembly approved a *resolution* (formal statement) called "Uniting for Peace." This resolution gave the Assembly the power to step in whenever peace is threatened and the Security Council has failed to act. In such an emergency, the Assembly can recommend actions for the UN, including the use of armed force if necessary.

Meetings and voting. The General Assembly holds one *regular session* each year, beginning on the third Tuesday in September and lasting about three months. A *special session* may be called if either the Security Council or a majority of member states requests it. Several special sessions have been called to discuss such matters as peacekeeping and finances. The "Uniting for Peace" resolution in 1950 set up a system for calling an *emergency special session* of the Assembly. Such a meeting can be called on 24 hours' notice if peace is threatened and the Security Council has not acted. Any nine members of the Security Council or a majority of UN members may call an emergency special session. Such sessions have been held for serious situations in the Middle East, Hungary, and other parts of the world.

Most questions that are voted on in the General Assembly are decided by a simple majority vote. Some subjects that the charter calls "important questions" need a two-thirds majority vote. These topics include peace and security and the election of new UN members. A simple majority vote of the Assembly may also make any other question an "important" one.

Committees. The UN Charter permits the General Assembly to create as many committees as it needs to help carry on its work. The Assembly has set up seven main committees—the First, Second, Third, Fourth, Fifth, and Sixth committees, and the Special Political Committee. Every member of the General Assembly—thus, every UN member—may have a representative on all these committees.

The First Committee discusses political and security questions and arms control. The Special Political Committee helps the First Committee with its tremendous volume of work. The Second Committee deals with economic and financial questions, the Third with social and cultural matters, and the Fourth with problems of countries that are not self-governing. The Fifth Committee handles administrative and budget matters, and the Sixth handles questions of law. Each committee studies the problems that have been assigned to it and makes recommendations to the General Assembly.

The General Assembly meets to discuss such matters as the UN budget and peacekeeping efforts. The secretary-general, the Assembly president, and an undersecretary sit on stage. Interpreters, reporters, and camera crews work in booths along the wall.

The Assembly has also set up other committees. They help organize and conduct each Assembly session, advise the Second and Fifth committees on financial and budget matters, or deal with problems involving nuclear energy, colonialism, and peacekeeping.

The Security Council

The UN Charter makes the Security Council responsible for keeping the peace. Until 1965, the Council had 11 members. Since then, it has had 15 members, of which 5 are permanent. The permanent members are France, China, Russia, the United Kingdom, and the United States. Russia's seat on the Council was held by the Soviet Union until 1991, when the Soviet Union broke apart. The 10 nonpermanent members of the Council are elected to two-year terms by the General Assembly. Each of the 15 members of the Security Council has one delegate on the Council. Some nations have called for expanding the number of permanent members to include such countries as Germany and Japan.

Powers. The Security Council has the power to decide what action the UN should take to settle international disputes. The charter states that the Council's decisions are made in the name of all UN members, who must accept them and carry them out. The Council encourages the peaceful settlement of disputes by calling on the opposing sides to work out a solution. Or the Council may ask the sides to accept a settlement worked out by other nations, individuals, or groups.

The Council itself may investigate a dispute and suggest ways of settling it. For example, the Council may call on UN members to stop trading with a country that is endangering peace and security. It may also ask the members to cut off communications with such a state, or to end contacts with its government. If such actions are not effective, the Security Council may ask UN members to furnish military forces to settle the dispute. The *Working for peace* section of this article describes some actions taken by the Security Council.

The Security Council also has several other important powers. It must approve all applications for membership of the UN. It selects a candidate for secretary-general. And it can recommend plans for arms control.

Meetings and committees. Security Council meetings may be called to consider any situation serious enough to lead to war. Such a situation can be brought to the Council's attention by any UN member—and in certain cases by nonmembers—by the secretary-general or by any major UN organ. The delegates must be able to attend a meeting as soon as it is called.

The Council makes its own rules for conducting its meetings. In the early years of the UN, it became a custom for the representative of a different nation to serve as president each month. The representatives take turns, in the order that their country's name appears in the English alphabet. UN members that are not members of the Council—and even nations that are not UN members—may be invited to take part in debates that affect them. But these nations have no vote.

The Council may appoint as many committees as it needs. The charter calls only for a Military Staff Committee of military representatives of the permanent members. Other committees have been set up from time to time, especially to organize the Council's work and to consider applications for UN membership.

Voting in the Security Council differs from that in any other UN organ. The Council can take action on some questions if any nine members vote in favour of the action. But on many other questions, the Council can act only if nine members—including all five permanent members—agree to do so. A "no" vote by any permanent member defeats such a question, no matter how many other members vote in favour of it. This special voting right of the permanent members is called a *veto.*

Almost any decision of the Council can be vetoed, but the Council has never established what kinds of decisions cannot be vetoed. Through the years, a few customs concerning the veto have developed. For example, a permanent member usually does not veto a decision about what subjects the Council should discuss, or about when the Council should adjourn. But a permanent member sometimes vetoes a decision about the order in which subjects are to be discussed. If a permanent member decides not to vote, or is absent at the time of voting, its action is not considered a veto.

The use of the veto in the Security Council has pre-

Meetings of the Security Council are held in a special chamber in the Conference Building. Delegates and their assistants sit at the semicircular table. Interpreters and other UN employees sit at the long table in the centre.

vented the United Nations from dealing with a number of major problems. The Soviet Union, until it was dissolved in 1991, used the veto almost as many times as the other four permanent members together.

The Secretariat

The Secretariat manages the day-to-day business of the United Nations. Its main job is to provide services for all the other UN organs. The Secretariat is made up of the secretary-general and other administrators assisted by clerks, secretaries, and specialists.

The secretary-general has broader powers than any other United Nations official. The secretary-general is the chief administrator of the UN and reports to the General Assembly each year on the organization's problems and accomplishments. The secretary-general advises governments and uses the influence of the office to help solve many problems. Most importantly, the charter gives the secretary-general the power to advise the Security Council of any situation that might threaten world peace.

The secretary-general is nominated by the Security Council and appointed by the General Assembly to a five-year term. All five permanent members of the Security Council must agree on a candidate before that person can be nominated. After the Council selects a candidate, it makes a recommendation to the General Assembly. A majority vote of the Assembly appoints a secretary-general.

Trygve Lie of Norway was the first secretary-general. He took office in 1946 and was later reelected. Lie resigned late in 1952 and left office in 1953. He spoke out on important questions and criticized the policies of some UN members.

Dag Hammarskjöld of Sweden followed Lie as secretary-general. Hammarskjöld advanced the right of secretaries-general to act on their own judgment for the UN in a situation threatening peace. Hammarskjöld was elected to a second five-year term in 1958 but was killed in an aeroplane crash in 1961.

U Thant of Burma was elected to complete Hammarskjöld's term. In 1962, U Thant was appointed to a full five-year term dating from 1961. He was reelected to the post in 1966.

In 1960, the Soviet Union demanded that the UN appoint three people to serve together as secretary-general. They wanted one representative for Communist members, another for Western nations, and a third for nations that supported neither side. The Soviets called their proposed triple leadership a *troika. Troika* is a Russian word meaning *a group of three.* Their effort failed, but after U Thant took office, he appointed a number of undersecretaries. Communist, Western, and other nations were all represented. In 1972, U Thant was succeeded by Kurt Waldheim of Austria. Waldheim was reelected in 1976. In 1982, Waldheim was succeeded by Javier Pérez de Cuéllar of Peru. Pérez de Cuéllar was appointed to a second term of office in 1987. Boutros Boutros-Ghali of Egypt became secretary-general in 1992.

Other employees. The Secretariat has about 9,000 employees, of whom about half work at UN headquarters. The rest work at the UN's European headquarters in Geneva, Switzerland, or in special UN missions and agencies throughout the world.

The secretary-general is responsible for appointing

Trygve Lie

Dag Hammarskjöld

U Thant

Kurt Waldheim

Javier Pérez de Cuéllar

Boutros Boutros-Ghali

The secretaries-general of the United Nations have been Trygve Lie of Norway, who served from 1946 to 1953; Dag Hammarskjöld of Sweden, 1953 to 1961; U Thant of Burma, 1961 to 1971; Kurt Waldheim of Austria, 1972 to 1981; Javier Pérez de Cuéllar of Peru, 1982 to 1991; and Boutros Boutros-Ghali of Egypt, who became secretary-general in 1992.

and organizing the staff of the Secretariat. The charter instructs the secretary-general to choose staff members from as many different member nations as possible. Employees include accountants, economists, lawyers, mathematicians, translators, typists, and writers. Every UN member country may fill at least six Secretariat jobs if it can provide qualified individuals. A UN employee works for the secretary-general and is not allowed to take orders from any member nation.

Other main organs

The Economic and Social Council. The United Nations is the first international organization with a major organ devoted to improving the way people live. The Economic and Social Council works to encourage higher standards of living, better health, cultural and educational cooperation among nations, and observance of human rights. It makes recommendations in these areas to the General Assembly, individual nations, and the UN's specialized agencies. For example, the Council recommends to the General Assembly the economic and social projects it considers worthy of UN support. The Assembly then may grant funds for these projects.

The Economic and Social Council is responsible for working with the specialized agencies. In addition to making recommendations to them, the Council communicates recommendations from the agencies to the General Assembly. The Council also cooperates with more than 100 other organizations throughout the world, including the Red Cross and trade unions.

The Council has 54 member nations. Each year, the General Assembly elects 18 members to serve for three years. The Council meets twice a year, but it may also hold special sessions. Each member has one vote, and decisions are made by a simple majority. The Council may allow any UN member or specialized agency to take part in discussions of concern to them. But only Council members may vote.

The Council has a number of commissions that assist in its work. Four commissions deal with the economic problems of certain regions—Africa, Asia and the Far East, Europe, and Latin America. Six other commissions deal with questions of human rights, narcotics, population, social development, statistics, and women's rights. A number of other bodies also assist the Council. They include the governing boards of the United Nations Children's Fund (UNICEF) and the United Nations Development Programme.

The International Court of Justice deals with the legal problems of the United Nations. The court has 15 judges, each appointed to a nine-year term. The Security Council and the General Assembly, voting independently, select the judges. No two judges may come from the same country, and the world's major civilizations and legal traditions must be represented. The court traditionally includes one judge from each of the permanent members of the Security Council. It elects a president and vice president to three-year terms. The headquarters of the court are at The Hague in the Netherlands.

Any UN member may bring a case before the court. The court has helped settle disputes between various countries, including Great Britain and Norway, Belgium and the Netherlands, and Honduras and Nicaragua. These disputes have concerned such matters as fishing rights and the ownership of border territory. The General Assembly and the Security Council have also permitted some nonmember states, such as Switzerland and Liechtenstein, to have cases heard by the court. An individual cannot bring a case to the court unless his government sponsors it.

No nation can be forced to bring its disputes before the International Court of Justice. Many governments have declared that they will seek court rulings in certain types of disputes. Some nations, including the United States, have said that they will decide for themselves what cases to bring before the International Court. Any nation that seeks a ruling from the court must agree to accept its decision. The court makes its decisions by majority vote.

The International Court gives advisory opinions to the General Assembly upon request. The Assembly also has permitted the Security Council, the Economic and Social Council, the Trusteeship Council, and the specialized agencies to request such opinions.

The Trusteeship Council was designed to help a number of territories that were not self-governing at the end of World War II. Some of these territories were colonies of Italy and Japan. Others were German colonies that had become *mandates* of the League of Nations after World War I (see **Mandated territory**). The UN Charter made the Trusteeship Council responsible for all these territories and for any others that nations might choose to entrust to it. Such areas are called *trust territories.* The Council works to help the trust territories become self-governing or independent.

There were originally 11 trust territories. The UN ac-

Present and former UN trust territories

This table lists the 11 original trust areas, their trustees, and the dates that some have achieved independence.

Name	Trustee	Status
Cameroons	Great Britain	Independent as parts of Cameroon and Nigeria, 1961
Cameroons	France	Independent as Cameroon, 1960
Nauru	Australia	Independent, 1968
New Guinea	Australia	Independent as part of Papua New Guinea, 1975
Pacific Islands (Palau Islands)	United States	Strategic Area Trusteeship (under the Security Council)
Ruanda-Urundi	Belgium	Independent as Rwanda and Burundi,1962
Somaliland	Italy	Independent as Somalia, 1960
Tanganyika	Great Britain	Independent, 1961
Togoland	France	Independent as Togo, 1960
Togoland	Great Britain	Independent as part of Ghana, 1957
Western Samoa	New Zealand	Independent, 1962

cepted one or more member nations as *trustees* for each territory. The trustee countries govern the trust territories under the direction of the UN. The Trusteeship Council is made up of representatives of the trustee nations and of all permanent members of the Security Council that do not govern trust territories. The Trusteeship Council meets at least once every year.

Ten trust territories have either become independent or have voted to become a part of other nations. Only one has not decided its own political future—the Trust Territory of the Pacific Islands (Palau Islands), governed by the United States. See **Pacific Islands, Trust Territory of the.**

Specialized agencies

The specialized agencies are self-governing international organizations related to the United Nations. They deal with such worldwide problems as agriculture, communications, living and working conditions, and health. Some of the agencies are older than the UN itself. Each agency has its own organization, membership, and rules, and each has signed an agreement with the UN. The agency agrees to consider recommendations

Irrigation and land development projects receive funds from the Food and Agriculture Organization (FAO), a specialized agency of the United Nations. As part of an FAO programme, these workers are rebuilding an irrigation canal in Sumatra.

Specialized agencies of the United Nations

Food and Agriculture Organization of the United Nations (FAO)

Helps improve the production of farms, forests, and fishing waters.

International Maritime Organization (IMO)

Encourages cooperation in shipping practices and regulations.

International Civil Aviation Organization (ICAO)

Works for greater safety in air service and for standard international flying regulations.

International Development Association (IDA)

Works with the World Bank. It lends money on easier terms than does the World Bank or the International Finance Corporation.

International Finance Corporation (IFC)

Works with the World Bank. It encourages smaller, private developments. It mostly lends money for large governmental projects.

International Fund for Agricultural Development (IFAD)

Finances projects to increase food production in developing countries.

International Labour Organization (ILO)

Helps improve working and living conditions throughout the world.

International Monetary Fund (IMF)

Helps adjust differences between the money systems used by various countries, making it easier for nations to trade with one another.

International Telecommunication Union (ITU)

Helps nations cooperate to solve problems dealing with radio, telephone, telegraph, and satellite communications.

UNESCO (United Nations Educational, Scientific and Cultural Organization)

Encourages educational, scientific, and cultural progress to increase understanding among nations.

United Nations Industrial Development Organization (UNIDO)

Organizes and funds industrialization projects for developing countries.

Universal Postal Union (UPU)

Works for international cooperation in the delivery of mail.

World Bank

Officially called the International Bank for Reconstruction and Development (IBRD). It lends money to help countries with such projects as dams, power plants, and railways.

World Health Organization (WHO)

The world's principal agency for dealing with health problems.

World Intellectual Property Organization (WIPO)

Works for international cooperation to protect artistic and literary works, inventions, and trademarks against copying.

World Meteorological Organization (WMO)

Encourages nations to cooperate in weather forecasting.

The Economic and Social Council works to improve the standard of living in UN member nations.

made by the UN and to report back on steps it takes to carry them out. The Economic and Social Council has the responsibility of helping the UN and the specialized agencies work together effectively.

Each specialized agency was set up to deal with a problem involving the cooperation of many nations. Some of the agencies were established to deal with problems of transportation or communication between countries. Other agencies were set up to help countries that had suffered greatly as a result of war or that had recently become independent. These agencies may provide loans, educational assistance, or other types of aid.

See the *Related articles* at the end of this article for a list of the specialized agencies that have separate articles in *World Book.*

The members at work

Delegations. Each nation has its own rules for appointing delegates to the UN. Generally, the head of state or the head of government of a member nation nominates delegates. The nominees may be subject to approval by the national legislature. The delegation of each country has a *head delegate* who is that country's official representative at the UN.

Most UN members keep a permanent *mission* of one or more representatives at UN headquarters. A permanent mission is helpful for taking part in long-term projects and for keeping up with current developments.

Breaking the language barrier. Dozens of languages are spoken by United Nations delegates. But when conducting official business, the UN uses only six languages—Arabic, Chinese, English, French, Russian, and Spanish. Delegates may address the General Assembly in any language if they provide a translation into one of the official languages. Skilled interpreters instantly translate the words into each of the other official languages. The delegates wear earphones to listen to the translation they choose.

Groups with common interests. As UN membership has grown, most nations with similar interests have banded together. The African nations have their own group, as do the Arab countries and the Asian lands. The Latin-American nations, except for the Communist country of Cuba, make up another group. All these groups meet regularly for various reasons—for example, to decide on a plan of action or to agree on candidates in a UN election. Members of the Commonwealth of Nations meet together regularly for discussion but seldom vote as a group. A few nations, including Israel, South Africa, and the United States, do not meet or vote regularly with any group.

Publications and information services. The UN provides information about its work to member nations and to the public. Each major organ of the UN, as well as many UN agencies, issues documents that give a complete account of its work. These documents give UN members information that helps them carry out their duties.

The UN also issues many publications of interest to the public. The *UN Monthly Chronicle,* for example, describes work done by the UN each month. Booklets deal with such subjects as statistics, human rights, or economic development. Many UN publications are issued in several or all of its six official languages.

The UN has an Office of Public Information, which is part of the Secretariat. One of its responsibilities is to direct UN information offices in about 50 cities throughout the world. Each office provides information about the UN to people in nearby regions.

Working for progress

An increasingly important goal of the United Nations is to help make the world a better, safer place in which to live. One way the UN works toward this goal is by providing various types of aid for countries and different groups of people. The UN also works for progress in many other fields, including human rights, peaceful uses of nuclear energy, and pollution control.

Economic and technical aid consists of grants, loans, training programmes, and other means of helping nations develop their resources, production, and trade. After World War II, the International Bank and the International Monetary Fund gave financial assistance to war-torn countries. But the amount of aid they could give was small compared with the amount needed. Most western European countries depended on the United States to help them recover from the war.

As more and more poor countries joined the UN, the organization began to help them. The resources of these countries are either undeveloped or have been developing slowly. Many such nations have become independent since World War II.

The UN dedicated the period from 1961 to 1970 as the first United Nations Development Decade. The UN's goal during this period was to help the developing countries increase their national income by 5 per cent each year. The industrialized nations were asked to donate 1 per cent of their yearly national income to the programme.

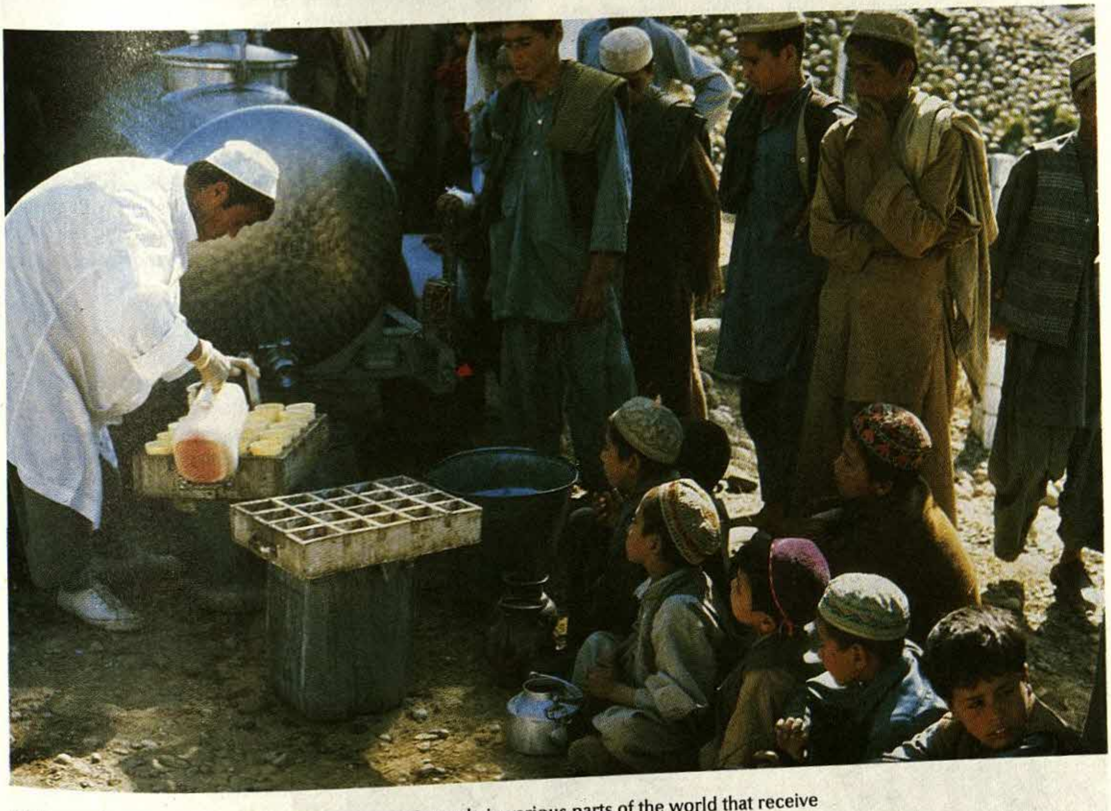
The first Development Decade did not meet all its goals, but some progress was made. The International Bank increased the number and size of its loans for the construction of roads, factories, and similar projects. In 1964, the UN held a Conference on Trade and Development (UNCTAD). The main aim of this conference was to encourage international trade, especially between the rich, developed countries and the poor, developing ones. The conference set up a Trade and Development Board, and itself became a permanent organ of the General Assembly. UNCTAD decides on courses of UN action concerning trade and development. The Trade and Development Board carries out UNCTAD's decisions. The board meets at least twice a year to consider such matters as improving international shipping or helping the developing countries find markets for their products.

In 1965, the UN combined its technical aid programmes to form the United Nations Development Programme (UNDP). The UNDP helps nations make studies of their unused natural resources so they can find ways to use them. For example, it suggests ways for nations to make their farms, mines, and water resources more productive. The programme also helps people learn the skills needed to develop their country's resources. The UN has helped about half a million men and women learn to manage, as well as work in, industries that will benefit their countries. In 1966, the General Assembly set up the United Nations Industrial Development Organization (UNIDO) to encourage industrialization in developing countries.

Since the early 1970's, the United Nations has increased its efforts to expand international trade and to provide economic and technical assistance. It also has worked to help the developing countries regulate the growth of their populations, and to promote world disarmament.

Aid to refugees. The United Nations aids refugees by protecting their legal rights, providing them with food and shelter, and finding them new homes. The UN has declared that the legal rights of refugees include the right to a job, to an education, and to freedom of religion.

During World War II, 44 governments cooperated in setting up the United Nations Relief and Rehabilitation Administration (UNRRA) to conduct war relief. After the United Nations was created, UNRRA was replaced by the International Refugee Organization (IRO), a spe-



Afghan refugees are one of the many groups of people in various parts of the world that receive UN aid. UN agencies also provide loans and other assistance for developing countries.

cialized agency. By 1951, the worst of the problems that were caused by the war were over and the IRO was discontinued.

In 1951, the General Assembly set up the Office of the United Nations High Commissioner for Refugees. This agency has assisted refugees from many countries. The main duty of the High Commissioner is to protect the rights of refugees in foreign countries. The Office of the High Commissioner has a small fund raised by voluntary contributions. But in general, it must work through governments and private agencies.

The UN has a special agency to assist Arab refugees in Palestine—the United Nations Relief and Works Agency for Palestine Refugees in the Middle East (UNRWA). The General Assembly set up the agency to help Arabs made homeless by the 1948 war between Israel and the Arab states. There have been continual wars in this region, and several million Arabs have become refugees. UNRWA originally provided food, shelters, medical care, and other services. Today, educational and health care have become its main concerns.

Aid to children. The General Assembly established the United Nations Children's Fund (UNICEF) in 1946. UNICEF's job was to provide food, clothing, and medical supplies for child victims of World War II. The emergency caused by the war ended by the early 1950's, but UNICEF had become so popular that the General Assembly made it a permanent organization in 1953. Today, UNICEF provides aid for child development and care, job training, and family planning.

UNICEF's funds come from voluntary contributions. About three-quarters of the organization's funds are donated by governments, and the rest is raised privately. See **UNICEF**.

Human rights. In 1946, the United Nations set up the Commission on Human Rights as part of the Economic and Social Council. The commission wrote the Universal Declaration of Human Rights, which all members of the General Assembly approved in 1948. This declaration expressed the hope that people would learn to respect the rights and dignity of others. Parts of the declaration have been included in the constitutions of El Salvador, Haiti, Indonesia, Jordan, Libya, Puerto Rico, and Syria.

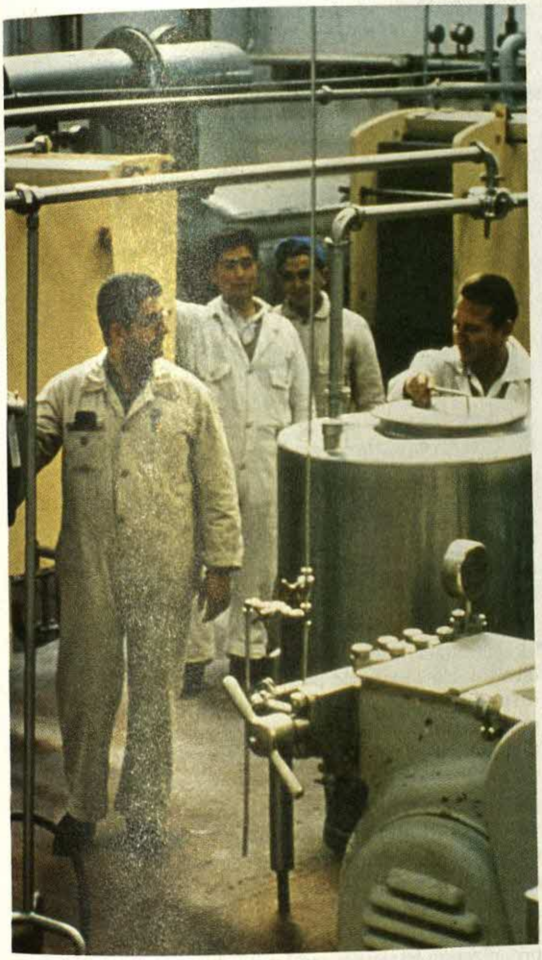
Racial problems have received more attention than any others brought before the UN. These problems—and those of colonialism and economic development—are the main concern of the Asian and African delegates, who make up a majority in the UN. In 1965, the General Assembly approved a treaty called the International Convention on the Elimination of All Forms of Racial Discrimination. The treaty went into effect in 1969, after the governments of 27 nations had approved it. Similar UN treaties deal with slavery, the rights of refugees, and the crime of *genocide* (elimination of an entire national, racial, or religious group).

Peaceful uses of nuclear energy. In 1953, President Dwight D. Eisenhower of the United States suggested to the General Assembly that governments contribute nuclear materials to an international agency. This agency would use such materials to help develop peaceful uses of nuclear energy.

In 1957, the UN set up the agency that Eisenhower had suggested. The International Atomic Energy Agency (IAEA) is separate from the UN but works closely with it. Its main responsibility is to encourage peaceful uses of nuclear energy. The agency also tries to make certain that no nuclear materials held or supplied by its member nations are used for making weapons. It controls its members' nuclear materials and conducts inspections of nuclear facilities in many countries. All the nuclear projects of IAEA members in Latin America, Asia, and the Pacific area operate under IAEA safeguards. A treaty prohibiting the spread of nuclear weapons went into effect in March, 1970. The IAEA is responsible for inspections that make certain the treaty is not broken.

The IAEA cooperates with many other agencies to encourage the sharing of nuclear information. It also encourages research and experiments dealing with atomic fuels, atomic medicine, *desalination* (removing the salt) of seawater, and other uses of nuclear energy.

UNICEF aids children by assisting countries in such areas as health care, sanitation and water supply, and education. The UNICEF workers at the left are drilling a water well for a village in Sierra Leone.



UN agencies provide training programmes and other economic aid to industries in developing countries. Dairy workers in Chile, *above,* are learning about powdered milk production.

Controlling the environment. A United Nations conference in 1972 resulted in a programme which encouraged international cooperation to fight pollution. In June 1992, the United Nations Conference on Environment and Development, referred to as the Earth Summit, was held in Rio de Janeiro, Brazil. Two treaties were signed by most of the world's nations, agreeing to reduce the emission of gases such as carbon dioxide which are believed to cause global warming, and to protect endangered species and cooperate on genetic and biological technology. They also made joint declarations on the principles of conserving the world's forests, and on means of economic development that would minimize damage to ecosystems and protect nonrenewable resources. The industrialized nations agreed to increase their aid to developing nations. But no agreement was reached on restraining the growth of the human population, which many scientists see as the greatest threat to the environment.

Fighting hunger has always been a major goal of the UN. The Food and Agriculture Organization of the United Nations (FAO), a specialized agency, was established in 1945. It works to improve the production and distribution of food and other agricultural products. The World Food Programme began in 1962 as a joint project of the UN and FAO. It provides emergency food aid and other assistance to developing countries.

In the 1970's, food production in many countries fell behind population growth. In 1974, the UN World Food Conference met in Rome to discuss the food shortage. This conference established a new UN agency, the World Food Council. The council coordinates the delivery of about 10 million tons of food sent to developing nations every year.

The World Food Council also accumulates world food reserves for use in time of famine. The council works through other agencies that deal with the supply of food, including the FAO, the United Nations Development Programme (UNDP), and UNICEF. The Rome conference also created an international warning system to detect future food shortages.

In some cases, the UN has delivered food and medicine to war-torn countries to relieve civilians of shortages. It has also sent peacekeeping troops to protect such deliveries.

The founding of the UN

Early in World War II, the representatives of nine European governments fled to London. Nazi Germany had conquered much of Europe and had driven these leaders from their homelands. Representatives of the United Kingdom (UK) and the Commonwealth nations met in London with leaders of Belgium, Czechoslovakia, France, Greece, Luxembourg, the Netherlands, Norway, Poland, and Yugoslavia. On June 12, 1941, all these nations signed a declaration pledging to work for a free world, where people could live in peace and security. This pledge, usually called the *Inter-Allied Declaration,* was the first step toward building the UN.

The Atlantic Charter followed the Inter-Allied Declaration by two months. It was signed by President Franklin D. Roosevelt of the United States and Prime Minister Winston Churchill of the United Kingdom. The charter expressed their hope for a world where all people could live free from fear and need. It also expressed their intention to seek eventual disarmament and economic cooperation. See **Atlantic Charter.**

On Jan. 1, 1942, representatives of 26 nations signed the *Declaration by United Nations.* This was the first official use of the words *United Nations.* The declaration approved the aims of the Atlantic Charter and was later signed by 21 other nations.

On Oct. 30, 1943, representatives of China, the Soviet Union, the United Kingdom, and the United States signed the *Moscow Declaration on General Security.* This declaration approved the idea of an international organization for preserving world peace. A month later, Roosevelt, Churchill, and Premier Joseph Stalin of the Soviet Union met at Teheran, Iran. At this meeting, the three men declared that they recognized the responsiblity of all the United Nations to achieve lasting peace. See **Teheran Conference.**

The Dumbarton Oaks Conference. From August to October 1944, representatives of China, the Soviet Union, the United Kingdom, and the United States held a series of meetings at the Dumbarton Oaks estate in

Washington, U.S.A. Their goal was to plan a peacekeeping organization. The four nations succeeded in drawing up a basic plan, but could not agree on some important questions. The plan's main feature was a Security Council on which China, France, the Soviet Union, the UK, and the U.S.A. would be permanently represented. The issue of voting rights and procedures within the Council remained unsettled. See **Dumbarton Oaks.**

In February 1945, Roosevelt, Churchill, and Stalin met at Yalta in the Crimea. At this meeting, they agreed that some minor actions of the Security Council could not be vetoed by the permanent members. The three leaders announced that a conference of United Nations would open in San Francisco on April 25, 1945. This conference would use the plan worked out at the Dumbarton Oaks Conference to help prepare a charter for the UN.

The San Francisco Conference. Delegates from 50 nations met in San Francisco for the United Nations Conference on International Organization. The conference opened on April 25, 1945, 13 days after the death of President Roosevelt and 12 days before the surrender of Germany. Victory over Japan was still four months away.

At the conference, some major disagreements arose between the Big Three (the Soviet Union, the United Kingdom, and the United States) and the smaller, less powerful nations. The Big Three believed they could guarantee future peace only if they continued to cooperate as they had during the war. They insisted that the Charter of the United Nations should give them the power to veto actions of the Security Council. The smaller nations opposed the veto power but could not defeat it. They did succeed in adding to the importance of other UN organs, such as the General Assembly and the Economic and Social Council. Such efforts by smaller nations helped create an organization that had far-reaching powers.

On June 26, 1945, all 50 nations that were present at the conference voted to accept the charter. Poland had been unable to attend the conference but later signed the charter as an original member. The charter then had to be approved by the governments of the five permanent members of the Security Council and of a majority of the other nations that signed it. The charter went into effect on Oct. 24, 1945, a date that is celebrated every year as United Nations Day.

Building UN headquarters. The first session of the General Assembly opened in London early in 1946. The delegates took up the question of where the permanent headquarters of the United Nations should be located. They considered invitations from various countries and finally agreed that the headquarters should be in the United States. On Dec. 14, 1946, the Assembly accepted a gift of 8.5 million U.S. dollars from John D. Rockefeller, Jr., of the United States to buy 7 hectares of land along the East River in New York City. The city itself donated additional land in the area. In 1947, the General Assembly approved plans for the headquarters buildings. The next year, the U.S. Congress approved an interest-free loan of 65 million U.S. dollars for their construction. The buildings were completed in the autumn of 1952.

Working for peace and security

The most important goals of the United Nations include achieving world peace and security. The UN has helped end conflicts around the world through the negotiation of cease-fires and peace agreements. After the fighting stops, the UN may send peacekeeping forces to the region. It may help the warring groups find ways to prevent the fighting from starting again. The UN may also try to restore order to a country at civil war. Such action is sometimes called *peacemaking* instead of *peacekeeping.*

In some cases, the UN has helped peoples gain self-government or independence from colonial rule. The organization has even used military force to preserve or

The signing of the UN Charter took place on June 26, 1945. President Harry S. Truman, *far left,* stood by as Secretary of State Edward Stettinius, Jr., signed for the United States.

A warehouse for storing food is being constructed by villagers in central Africa with aid from the United Nations Development Programme (UNDP). This programme helps nations develop their human and natural resources.

regain the independence of a country that has been attacked by another. In addition, the UN has sought to achieve world peace and security by sponsoring arms control agreements, and treaties on the peaceful use of outer space and the seabed.

UN members have never agreed on a permanent police force to deal with international disputes. In many cases, powerful members, such as the former Soviet Union and the United States, have preferred to use their own forces to deal with certain conflicts. But the UN sends peacekeeping forces if both sides in a conflict agree to have them come. It may also send forces if such action seems to be the only way to restore order in a country that is being torn apart by civil war.

The UN has been unable to stop wars from breaking out in many parts of the world. For many years, disagreements among UN member undermined the effectiveness of the organization. Since the late 1980's, however, increased cooperation among member countries has enabled the UN to assume a larger role in working for peace. This cooperation has resulted in part from the fading of Cold War tensions during the late 1980's. These tensions had developed between Communist countries and non-Communist nations after World War II ended in 1945.

This section discusses some of the most important actions taken by the UN in its efforts to achieve peace and security around the world. For information on other UN actions of this type, see the table *Important events in UN history* that is part of this article.

Arab-Israeli conflicts have presented the United Nations with some of its most difficult peacekeeping problems. In 1947, the General Assembly approved a plan to divide Palestine into a Jewish state and an Arab state and to make Jerusalem an international city under UN control. Jerusalem is a holy city for Jews, Christians, and Muslims. More than 90 per cent of Arabs are Muslims. The Arab countries opposed the UN plan, which went into effect in 1948. The population of the new nation of Israel included many resentful Palestinian Arabs. Many of them fled to nearby Arab countries, where they became refugees.

A number of wars have broken out between Arab nations and Israel. Several times, the UN has helped arrange cease-fires to stop the fighting. In addition, the UN has sent peacekeeping forces to the region to try to prevent the fighting from starting up again.

In 1967—in what became known as the Six-Day War—Israeli forces fought against troops from Egypt, Jordan, and Syria. Israel gained control of Egypt's Gaza Strip and Sinai Peninsula, Jordan's West Bank, and Syria's Golan Heights. It also took over all of Jerusalem. Later that year, the UN Security Council called on Israel to give up all the Arab territory it had taken during the war and, in return, accept a promise from the Arab countries that they would not dispute Israel's borders. But both the Arabs and the Israelis continued to raid each other and to build up arms supplies.

In 1974, the General Assembly adopted a resolution recognizing the right of Palestine Arabs, including those in Israel, to nationhood. A second resolution gave *observer status* to the Palestine Liberation Organization (PLO), a group approved by Arab countries to represent the Palestinians. Observer status gave the PLO the right to attend General Assembly sessions but not to take part in them.

In 1975, many Western nations were angered when the General Assembly passed a resolution declaring that Zionism is "a form of racism." Zionism is the Jewish nationalist movement that helped establish the state of Israel. The Assembly repealed the resolution in 1991.

In 1978, Israel agreed to return the Sinai Peninsula to

Important events in UN history

1945 (April 25) The San Francisco Conference opened.

1945 (June 26) The Charter of the United Nations was signed by delegates at the San Francisco Conference.

1945 (Oct. 24) The UN was born as the required number of nations approved the charter.

1946 (Jan. 10) The first session of the General Assembly opened in London.

1946 (Feb. 14) The UN voted to have its headquarters in the United States.

1947 The General Assembly approved a plan to divide Palestine into a Jewish state and an Arab state. The plan went into effect in 1948.

1948 (Dec. 10) The UN approved the Universal Declaration of Human Rights.

1949 A UN commission arranged a cease-fire between the Netherlands and Indonesia and brought the two sides together for a peace conference. Indonesia had been a Dutch colony, and the two sides had been fighting off and on since 1945, when Indonesia demanded its independence. After the peace conference, the Netherlands granted independence to Indonesia.

1949 UN official Ralph Bunche arranged cease-fires between Israel and its opponents—Egypt, Syria, Jordan, and Lebanon. Israel and these Arab states had been at war over the 1948 division of Palestine into a Jewish state and an Arab state. Bunche won the 1950 Nobel Peace Prize for his achievement.

1949 The UN arranged a cease-fire and set up a truce line between India's and Pakistan's troops in the region of Kashmir, which both countries claimed. The fighting had broken out in 1947.

1950-1953 UN troops prevented Communist armies of North Korea from taking over South Korea in the Korean War.

1954 The Office of the United Nations High Commissioner for Refugees was awarded the Nobel Peace Prize.

1956 The UN arranged a cease-fire between Egypt and its opponents—Israel, the United Kingdom, and France—in a dispute over the Suez Canal. To preserve the cease-fire, it also sent a peacekeeping force to guard the borders between Egypt and Israel. The fighting had begun after Egypt blocked Israeli ships from the canal, following repeated Arab-Israeli border clashes. After blocking the Israeli ships, Egypt seized the canal from its British and French owners. Israel, France, and the UK attacked Egypt in response to its actions.

1960-1964 A UN force helped restore order in the former Belgian colony of Congo (now Zaire). Riots had broken out in the country when Belgians retained important positions in the army and the government after Congo gained independence from Belgium. Fighting had also begun between rival Congolese groups.

1962 Acting Secretary-General U Thant helped settle a dispute between the United States and the Soviet Union over the installation of Soviet missiles and missile bases in Cuba, about 145 kilometres from Florida, U.S.A. The Soviet Union finally removed its missiles from Cuba, but for several days the world had stood on the brink of nuclear war.

1962 The UN began governing West New Guinea after fighting over control of the area had broken out between the Netherlands and Indonesia. In 1963, the UN gave temporary control of the region to Indonesia. In 1969, the people of West New Guinea voted to remain a part of Indonesia.

1964 The UN sent a peacekeeping force to Cyprus to help prevent conflicts between Greek and Turkish Cypriots. Fighting had broken out between the two groups in 1963 after President Makarios of Cyprus had withdrawn some rights of the Turks.

1965 The UN helped arrange a cease-fire in Kashmir between troops from India and Pakistan. Both countries had claimed the region. The UN arranged a similar cease-fire between the two countries in 1949. Two UN observer groups enforced the 1965 cease-fire.

1965 UNICEF was awarded the Nobel Peace Prize.

1966 The Security Council voted for economic sanctions against Rhodesia (now Zimbabwe).

1967 The UN arranged a cease-fire between Israeli and Arab forces, ending the Six-Day War.

1968 The General Assembly endorsed a treaty designed to stop the spread of nuclear weapons.

1971 The General Assembly voted to expel Nationalist China and admit Communist China to the UN.

1973-1974 In 1973, the UN Security Council helped negotiate cease-fires between Israel and its opponents Egypt and Syria to end the Yom Kippur War. The war had begun when Egypt and Syria attacked Israeli forces along the Suez Canal and in the Golan Heights. The attack occurred on Yom Kippur, a Jewish holy day. In 1974, the UN sent a peacekeeping force to the Sinai Peninsula to supervise the separation of Egyptian and Israeli forces and to safeguard the cease-fire. It also sent a peacekeeping force to the Golan Heights to supervise the separation of Syrian and Israeli forces there.

1976 The General Assembly urged UN members to stop trading with South Africa, to halt arms shipments there, and to refuse sports competition with South African athletes. The Assembly's action was designed to pressure the South African government to end its *apartheid* policy of racial discrimination.

1977 The Security Council ordered all UN members to stop selling weapons to South Africa.

1978 The UN sent a peacekeeping force to Lebanon to help stop fighting there between Israel and the Palestine Liberation Organization (PLO), which was based in Lebanon. Israel had attacked PLO forces in Lebanon after the PLO launched repeated raids on Israel.

1981 The Office of the United Nations High Commissioner for Refugees was awarded the Nobel Peace Prize.

1988 UN peacekeeping forces were awarded the Nobel Peace Prize.

1988 The UN arranged a cease-fire between Iran and Iraq, who had been at war since 1980 over territorial disputes and other issues.

1988-1989 In 1988, the UN helped negotiate the withdrawal of Soviet troops from Afghanistan. The troops had entered Afghanistan in 1979 and 1980 to help the pro-Communist Afghan government fight Muslim Afghan rebels. The UN sent observers to inspect the withdrawal, which was completed in 1989.

1989-1990 In 1989, the UN sent a peacekeeping force to Namibia to oversee a cease-fire between Namibian and South African forces and to supervise Namibia during its transition to independence. In 1990, after UN-supervised elections, Namibia became an independent country.

1990 A UN peacekeeping force began overseeing a cease-fire between the left-wing Sandinista government of Nicaragua and right-wing Nicaraguan rebels known as *contras*. A civil war had developed between the government and the contras in the early 1980's.

1991 The UN arranged a cease-fire between Morocco and the Polisario Front, an organization that demanded independence for Western Sahara. Western Sahara is a region that borders Morocco. Morocco and the Polisario Front had been fighting for control of the region since the 1970's.

Continued on next page

Important events in UN history (continued)

1991 A military coalition of UN members expelled Iraqi military forces from Kuwait in the Persian Gulf War. Iraq had invaded and conquered Kuwait in 1990.

1991-1993 In 1991, the UN sponsored a peace treaty that ended a civil war in Cambodia. Since 1979, Cambodia's Communist government had been fighting a coalition of non-Communist and Communist rebels. In 1992, a civilian and military UN force began administering the Cambodian government during a period of transition to democracy. In 1993, the UN sponsored the first democratic national elections in Cambodia in many years. In the voting, Cambodians elected a non-Communist government.

1992 The UN helped negotiate a cease-fire and a peace agreement to end a civil war between government troops and leftist rebels in El Salvador. The war had begun in 1979 after the government failed to respond to demands from the poor for land reform and other changes.

1992 The UN negotiated a cease-fire agreement between Croatian and Serbian forces in Croatia and sent a peacekeeping force to Croatia. In 1991, the republics of Croatia and Slovenia had declared their independence from Yugoslavia. Serbia, which dominated the Yugoslav government, had strongly opposed the moves toward independence and sent federal troops to the area to fight the two republics' militias. The fighting between the Serbians and Slovenians ended without UN assistance.

1992 The UN began supplying food and medicine to civilians in the former Yugoslav republic of Bosnia-Herzegovina. Civil war had broken out there earlier that year between Serbs and the republic's militia. The UN also imposed a trade embargo on what remained of Yugoslavia in an attempt to end the fighting.

1992-1993 In 1992, the UN authorized United States and other troops to enter Somalia to protect international relief workers and their supplies. Civil war and drought had led to famine throughout the country. The presence of the troops helped reduce looting and fighting that had hindered delivery of humanitarian aid. In 1993, the UN took over leadership of the operation.

1993 A UN peacekeeping force began overseeing a cease-fire between Mozambique's government and a rebel group called Renamo. A civil war had developed between the two groups in the mid-1970's.

1994 Ten members of the UN Assistance Mission to Rwanda were killed. Scenes of genocide in Rwanda required the redeployment of 5,500 troops. The UN International Conference on Population and Development generated intense international controversy.

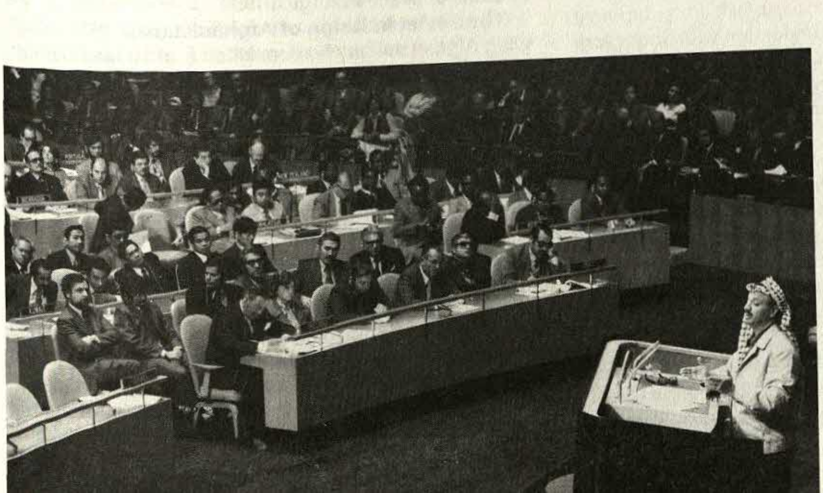
1995 Bosnian-Serbs took more than 300 UN peacekeepers hostage in May, in retaliation for NATO air strikes on weapons depots. Most were released the following month. UN forces were unable to protect a number of Bosnian-Muslim safe areas from invasion by Bosnian-Serb forces. Major UN conferences on social development, crime prevention, and women met in 1995.

Egypt. The two countries also agreed on autonomy for the Gaza Strip and the West Bank. Egypt and Israel signed a peace treaty in 1979. Egypt regained full control of the Sinai Peninsula in 1982. However, no arrangement for autonomy for the Gaza Strip and the West Bank was made. In September 1993, Israel and the PLO signed an agreement on a plan for self-government for, and Israel's withdrawal from, the Gaza Strip and the West Bank. Israel also recognized the PLO as the representative of the Palestinian people. Israel withdrew from Jericho and the Gaza Strip in 1994, and the Palestinians established a governing body. Also in 1994, Jordan and Israel signed a declaration that marked the end of a state of war that had technically existed between the two countries since 1948.

The Korean War (1950-1953) marked the first time a world organization ever took part in fighting a war. In this conflict, UN troops prevented Communist armies of North Korea from taking over South Korea.

The war grew out of the Cold War tensions that existed between Communist countries and non-Communist countries. At the end of World War II in 1945, Communist troops from the Soviet Union occupied Korea north of the 38th parallel, and United States troops occupied it to the south. In 1947, the UN appointed a commission to find ways to unite the country and form a national government. The northern part of Korea refused to take part in this plan. But elections were held in the southern part, and the Republic of Korea was set up there. In 1948, the General Assembly declared that the government of the Republic of Korea (South Korea) was the only legal government in Korea.

On June 25, 1950, troops from Communist-ruled North Korea invaded South Korea. The UN called the in-



Palestinian leader Yasir Arafat addressed the UN in 1974 during a debate on the status of the Arabs of Palestine. After the debate, the UN recognized the Palestinians' right to nationhood.

vasion a violation of international peace and demanded that the Communists withdraw from South Korea. The Security Council voted to ask members of the UN to send troops to assist South Korea. The Soviet Union could not veto the Council's action because it had temporarily withdrawn its delegate to protest against Nationalist China's membership on the Council.

On July 7, 1950, the Council formed a UN military command under the leadership of the United States. Of the 60 UN members, 16 sent troops to Korea and 41 sent supplies. The United States contributed about 90 per cent of the troops and supplies to South Korea.

In October 1950, Chinese Communist forces entered the war. The Security Council met to discuss the situation, but the Soviet delegate had returned and vetoed any attempt of the Council to act. The war ended on July 27, 1953, when North Korea and the United Nations signed a cease-fire agreement. By that time, the Communist troops had been expelled from almost all of the area south of the 38th parallel.

Problems in southern Africa. Over the years, the UN has taken a number of actions against white minority governments in southern Africa. These governments adopted discriminatory policies against blacks, who make up a large majority of the region's population. The discrimination led to civil wars and other unrest in southern Africa. The UN actions affected the nations of South Africa, Namibia (which was ruled by South Africa until 1990), and Rhodesia (now called Zimbabwe).

South Africa, the largest country of southern Africa, had been dominated by a white minority since before 1900. A similar situation existed in nearby Rhodesia. Whites controlled these countries until long after white rule had ended in most of Africa. In 1920, the League of Nations gave South Africa a mandate to manage the government and affairs of Namibia, a large territory adjacent to South Africa and inhabited chiefly by blacks.

In 1948, the government of South Africa established a policy of rigid, legal, racial segregation called *apartheid.* This policy was aimed at separating black Africans and whites socially. Numerous apartheid laws also increased discrimination against blacks in employment, education, and all other aspects of everyday life.

In 1974, the General Assembly began to exclude South Africa's delegation from its sessions because of the country's apartheid policy. In 1976, the Assembly passed a series of resolutions that urged UN members to stop trading with South Africa, to halt arms shipments there, and to refuse sports competition with South African athletes. In 1977, the Security Council ordered all UN members to stop selling weapons to South Africa. The order was the first such action that had ever been taken against a UN member.

The government of South Africa gradually repealed the laws that formed the legal basis of apartheid. The last such law was repealed in 1991. In 1994, South Africa held the first national elections in which blacks were allowed to vote. In these elections, the black majority won control of the government from the white minority, and antiapartheid leader Nelson Mandela became the country's first black president.

After the repeal of South Africa's apartheid laws in 1991, the General Assembly passed a resolution that urged all nations to again allow South Africa to participate in international sports events. In 1994, the UN ended its ban on military exports and other trade with South Africa. That same year, the General Assembly restored South Africa's right to participate in its sessions.

Namibia. The UN also helped Namibia gain its independence from South Africa. In 1966, the General Assembly voted to end South Africa's administration of Namibia. It called for setting up a UN council to govern Namibia until Namibia was ready for independence. South Africa refused to let the UN council enter Namibia and introduced apartheid there. The South West Africa People's Organization (SWAPO), a black Namibian political group, tried to persuade South Africa to grant Namibia independence. In the mid-1960's, it began using guerrilla tactics to further its goal. In 1989, the UN approved a plan calling for Namibia to be given full independence. Later that year, the UN sent a peacekeeping force to the region. South Africa withdrew its troops by November 1989. In 1990, Namibia gained independence after holding UN-supervised elections. The UN withdrew its peacekeeping force in 1991.

Rhodesia. The UN also took action against Rhodesia, which was not a UN member. In 1966, it ordered UN members to stop trading with Rhodesia and to halt weapons shipments to its rulers. These economic *sanctions* (penalties) were the first ever approved by the UN. Black Rhodesians fought a long guerrilla war to end white control of the country. In 1980, general elections were held. Rhodesia then became the independent nation of Zimbabwe, with a government in which blacks held most of the offices.

The Iran-Iraq War. In 1980, war broke out between Iran and Iraq as a result of territorial disputes and other disagreements. The UN Security Council made a plea for a peaceful settlement, but Iran rejected the plea. Olof Palme of Sweden, a special UN envoy to the Middle East, met with officials of Iran and Iraq several times between 1980 and 1982. But he failed to bring about an agreement between the two parties. From 1982 to 1987, the General Assembly and Security Council passed a number of resolutions calling for a cease-fire. But Iran and Iraq ignored the resolutions. The UN also participated in several other attempts to begin negotiations between the two parties. In 1988, Iran finally accepted a peace plan proposed by the Security Council. Soon afterward, a cease-fire was arranged. Iran and Iraq agreed to terms of peace in August 1990.

The Soviet invasion of Afghanistan. In 1978, left-wing Afghan military leaders killed Muhammad Daoud Khan, the president and prime minister of Afghanistan. The leftist group, which was supported by the Soviet Union, took control of the government and established Communist policies. Many Afghans opposed the new government. They believed its policies conflicted with the teachings of their religion, Islam. They also resented Soviet influence. A number of groups called *mujaheddin* (holy warriors) rebelled against the government.

In 1979 and 1980, Soviet forces entered Afghanistan to help the Afghan government fight the mujaheddin. The UN General Assembly quickly passed a resolution demanding immediate withdrawal of foreign troops from Afghanistan. More than 3 million Afghans fled from war-torn villages to neighbouring Pakistan and Iran. Beginning in 1982, the UN held numerous peace talks that involved Afghanistan, Iran, Pakistan, and the mujaheddin.

In 1987, the UN created a peace plan that called for noninterference in the internal affairs of countries in the region. In 1988, all parties reached agreement on the withdrawal of Soviet troops from Afghanistan.

The Nicaraguan conflict. In 1979, a rebel group called the Sandinista National Liberation Front overthrew the Nicaraguan government of President Anastasio Somoza Debayle. The Sandinistas set up a new government and took over key parts of the economy. In the early 1980's, opposition to the new government developed in Nicaragua concerning economic policy and the type of government to be established. Anti-Sandinista forces called *contras* launched attacks against government forces from bases in neighbouring Honduras.

In March 1989, five Central American presidents requested that the UN set up a peacekeeping force to help end the Nicaraguan conflict and other conflicts in Central America. As a result, the UN Security Council established the UN Observer Force for Central America (ONUCA) in November 1989. In an election in early 1990, the Sandinistas lost control of the government. Soon afterward, the contras agreed to disarm and to leave their bases in Honduras. The UN then assigned ONUCA to oversee a cease-fire between the Sandinistas and contras and to make sure that the two forces separated.

The Persian Gulf War. In 1991, a military coalition of UN members expelled Iraq from Kuwait, an oil-rich country on Iraq's southern border. Iraq had invaded and occupied Kuwait in August 1990. The economies of many Western countries depended on oil from Kuwait and from neighbouring Saudi Arabia, which many Westerners feared Iraq would invade next.

Soon after Iraq invaded Kuwait, the UN Security Council demanded that Iraq withdraw its forces. The Council also called on all countries to end their trade with Iraq until Iraq withdrew from Kuwait.

In November 1990, the Security Council authorized UN member nations to "use all necessary means" to expel Iraq from Kuwait if Iraq did not withdraw by Jan. 15, 1991. Iraq did not remove its forces by this deadline. On January 17, military forces of UN members began bombing Iraqi military targets in Iraq and Kuwait. UN members that sent troops included the United States, Canada, and several Western European and Arab countries. Ground forces invaded Kuwait and Iraq on February 24. On February 28, all military operations ended. On April 6, Iraq accepted the terms of a UN resolution calling for a cease-fire. The terms included Iraq's payment to Kuwait for war damages and the destruction of any Iraqi facilities or materials for producing nuclear weapons. After the cease-fire, the UN continued the trade embargo to pressure Iraq to carry out its agreements. UN inspectors dismantled Iraqi facilities used for making nuclear materials and destroyed many Iraqi weapons.

The Somalia operation involved a UN effort to use troops to stop a civil war. Before this operation, the UN tended to avoid using troops to end the fighting between warring groups. Many observers saw the operation as a sign that the UN was taking on the role of peace*maker* in addition to its role of peace-*keeper*.

The fighting had begun in Somalia after rebels overthrew the nation's military government in 1991. The warfare, together with a drought, led to famine throughout the country. To help stop the fighting, the UN Security Council imposed an arms embargo against Somalia in January 1992. But the fighting continued. Looting and the fighting made the delivery of humanitarian aid to civilians extremely difficult.

In September 1992, the Security Council authorized the United States to lead a coalition of military forces from several countries to enter Somalia to protect international relief workers and their supplies. The troops began to arrive in December. The looting and fighting decreased as a result, and the troops helped deliver large amounts of food to needy people. However, some fighting between Somali groups continued. In 1993, the UN took over leadership of the operation from the United States. Afterward, Somalis involved in the civil war killed a number of UN troops. The UN took military action against those responsible and continued to seek to restore order to the country.

The Yugoslav conflicts. In January 1992, the UN negotiated a cease-fire agreement between Serbia and the former Yugoslav republic of Croatia. In March, the Security Council dispatched a peacekeeping force to Croatia called the UN Protection Forces for Yugoslavia.

Also in March, the Yugoslav republic of Bosnia-Herzegovina (often called simply Bosnia) declared independence. Serbs in that republic opposed the declaration, and fighting broke out between them and the republic's militia. Serbian members of the Yugoslav army stationed in Bosnia fought on the side of the Bosnian Serbs. In May, the UN Security Council imposed a trade embargo on Yugoslavia in an attempt to end the fighting. By that time, Yugoslavia consisted only of the republics of Serbia and Montenegro. In June, UN aircraft began carrying food and medicine into Sarajevo, Bosnia's capital, to relieve the civilian population of shortages created by the fighting. In August, the UN authorized the use of military force to protect road convoys providing relief to civilians in besieged areas.

In 1992, the UN General Assembly voted to deny Serbia and Montenegro the right to automatically continue Yugoslavia's UN membership. By July 1993, over 7,500 UN troops were stationed in Bosnia. From 1993, UN troops occasionally came under attack from Bosnian-Serb forces. In May 1995, the Bosnian-Serbs took more than 300 UN troops hostage in retaliation for NATO air strikes on Bosnian-Serb weapons depots. They later released most of the hostages following intervention by the president of Serbia. In June, 15 Western allied nations agreed to assemble a 10,000-strong rapid reaction force to protect UN forces from further attacks.

Arms control. The UN Charter mentions only briefly the need for arms control. But the charter was written before the nuclear age began. By 1949, both the Soviet Union and the United States had atomic bombs. They agreed that controls were needed for such weapons but could not agree on what kind. The UN studied the problem, and the General Assembly issued many appeals for nations to reduce their arms production.

In 1961, the Soviet Union and the United States agreed on a plan to establish a disarmament committee. The UN approved the plan, and an 18-nation committee was set up. More nations were added in 1969. In 1979, the number was increased to 40, and the Committee on Disarmament became an official UN organ.

UN vehicles carry peacekeeping troops who are monitoring a cease-fire in Croatia. Fighting broke out in Croatia in 1991 after Croatia declared its independence from Yugoslavia.

The Cuban missile crisis of 1962 convinced both the Soviet Union and the United States to work harder for control of nuclear weapons. During that crisis, the world had stood on the brink of nuclear war (see **Cold War** [The Cuban missile crisis]). In 1963, three nations with nuclear weapons—the Soviet Union, the United States, and the UK—along with most other UN members, signed a treaty outlawing nuclear tests in the atmosphere, in outer space, and underwater—but not underground. The Soviet Union, the UK, and the United States also agreed not to put such weapons in orbit.

In 1968, the United Nations approved a *nonproliferation treaty.* This treaty prohibits the nuclear powers that signed and ratified it—originally the Soviet Union, the UK, and the United States—from giving nuclear weapons to nations that do not already have them. The treaty went into effect in 1970. China and France signed the treaty in 1992. After the Soviet Union was dissolved in 1991, three former Soviet republics with nuclear weapons signed the nonproliferation treaty—Russia in 1992 and Belarus and Kazakhstan in 1993.

In 1971, the General Assembly approved a treaty banning the production and stockpiling of biological weapons. The treaty took effect in 1975. In 1993, 125 countries signed a UN-sponsored treaty banning the manufacture, use, transfer, and stockpiling of chemical weapons. The treaty still required ratification by 65 countries.

Peaceful uses of outer space and the seabed. In 1958, the UN secretary-general asked all nations to agree not to claim territory in outer space. The General Assembly stated in 1963 that no nation could claim any part of outer space. In 1967, over 90 countries signed a treaty reflecting these aims.

The question of uses of the seabed came before the General Assembly for the first time in 1967. The Assembly noted that new inventions allowed nations to use the seabed as a source of valuable minerals and in other new ways. The Assembly appointed a permanent 42-nation committee to study the problem. The committee agreed that a large area of the seabed should be beyond the control of individual nations and should be used only for the benefit of all people. In 1971, the UN created a treaty barring the testing or use of nuclear weapons on the seabed beyond a 12-nautical-mile (about 22 kilometres) coastal zone. The treaty took effect in 1972. In 1982, a UN conference adopted the Law of the Sea Treaty, which covered many uses of the ocean. The treaty required 60 nations to ratify it, and this number was achieved in 1994.

Continuing problems

Finances. Every UN member must pay a share of the organization's daily expenses. The amount each member pays depends on its ability to pay. UN rules say that no member can pay more than 25 per cent or less than 0.01 per cent of the UN's ordinary expenses.

The UN has been seriously weakened by the failure of many of its members to pay their share of the organization's expenses. Numerous nations have fallen behind in their payments or have made only partial payments. This unpaid debt totalled hundreds of millions of dollars in the early 1990's. The United States and Russia were among the largest UN debtors.

Membership questions. Most nations are UN members. The question of membership for Communist China came up at every General Assembly session from 1950 to 1971. In 1971, the Assembly voted to expel Nationalist China and admit Communist China to the UN.

In 1992, the UN suspended Yugoslavia's participation in the General Assembly and in the Economic and Social Council after most Yugoslav republics declared their independence. All the independent republics have been admitted to the UN as separate nations.

Nations join the UN for various reasons. Membership gives some nations a place in the international community that they might not otherwise have. Some of these nations are so small that they cannot afford their own embassies. Through one mission at the UN, such nations can easily keep in contact with most other governments. Membership of the UN enables small nations to bring their problems to public attention and to take part in UN programmes of economic and technical assistance.

The presence of many small nations in the UN has also created some problems. In the General Assembly, the vote of the smallest state counts the same as the vote of the largest. Some nations have suggested that small countries be given less than a full vote.

Only one nation—Indonesia—has ever withdrawn from the UN. Indonesia rejoined less than two years later. Most countries appear unwilling to try to get along without the UN. They also realize the value of international effort in dealing with certain kinds of economic and social problems. Above all, members understand that UN efforts toward peacekeeping and peacemaking can help prevent a third world war.

Related articles in ***World Book*** include:

Biographies

Boutros-Ghali, Boutros
Bunche, Ralph J.
Hammarskjöld, Dag
Lie, Trygve
Pandit, Vijayalakshmi
Pérez de Cuéllar, Javier
Smuts, Jan C.
Spaak, Paul-Henri
Thant, U
Waldheim, Kurt

Specialized agencies

Food and Agriculture Organization
International Civil Aviation Organization

International Development Association
International Finance Corporation
International Labour Organization
International Maritime Organization
International Monetary Fund
International Telecommunication Union
Postal Union, Universal
UNESCO
World Bank
World Health Organization
World Intellectual Property Organization
World Meteorological Organization

Other related articles

Cold War
Developing country
Human Rights, Universal Declaration of
International Atomic Energy Agency
International Court of Justice
Korean War
League of Nations
San Francisco Conference
Third World
UNICEF
United Nations University
World (picture)

Outline

I. The charter
  A. Purposes and principles
  B. Membership requirements
  C. The six major UN organs
  D. Amending the charter
II. The General Assembly
  A. Powers
  B. Meetings and voting
  C. Committees
III. The Security Council
  A. Powers
  B. Meetings and committees
  C. Voting
IV. The Secretariat
  A. The secretary-general
  B. Other employees
V. Other main organs
  A. The Economic and Social Council
  B. The International Court of Justice
  C. The Trusteeship Council
VI. Specialized agencies
VII. The members at work
  A. Delegations
  B. Breaking the language barrier
  C. Groups with common interests
  D. Publications and information services
VIII. Working for progress
  A. Economic and technical aid
  B. Aid to refugees
  C. Aid to children
  D. Human rights
  E. Peaceful uses of nuclear energy
  F. Controlling the environment
  G. Fighting hunger
IX. The founding of the UN
  A. The Atlantic Charter
  B. The Dumbarton Oaks Conference
  C. The San Francisco Conference
  D. Building UN headquarters
X. Working for peace and security
  A. Arab-Israeli conflicts
  B. The Korean War
  C. Problems in southern Africa
  D. The Iran-Iraq War
  E. The Soviet invasion of Afghanistan
  F. The Nicaraguan conflict
  G. The Persian Gulf War
  H. The Somalia operation
  I. The Yugoslav conflicts
  J. Arms control
  K. Peaceful uses of outer space and the seabed
XI. Continuing problems
  A. Finances
  B. Membership questions

Questions

How many UN member nations are represented in the General Assembly?
What are the two main goals of the UN?
What are the duties of the secretary-general of the UN?
How does voting in the Security Council differ from voting in other UN organs?
What are the two main differences between the UN and the League of Nations?
What are the official languages of the UN?
Which UN organ works with the specialized agencies?
What nations are permanent members of the Security Council?
Why was the Dumbarton Oaks Conference held?
Has any nation ever withdrawn from the UN?

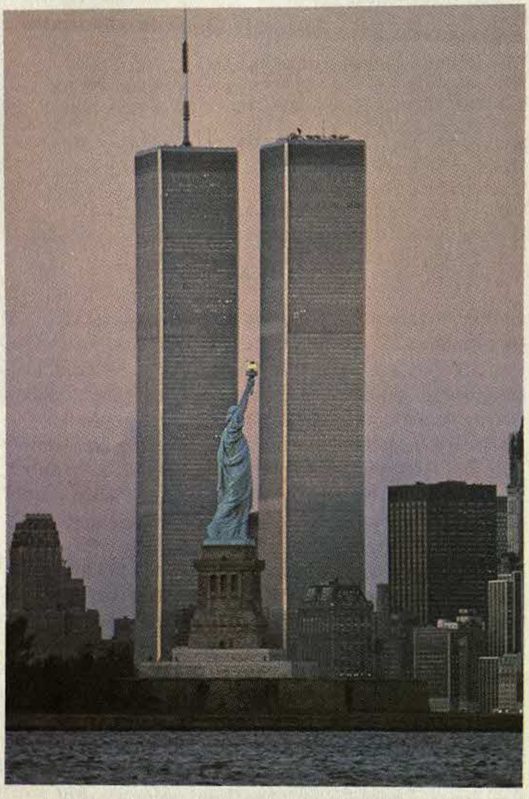
United Nations Industrial Development Organization (UNIDO) is a specialized agency of the United Nations (UN) that promotes industrialization in developing countries. Most countries that belong to the UN are also members of UNIDO. The agency provides assistance in such areas as industrial training and planning and encourages the transfer of technology to developing countries. UNIDO was created in 1966 as part of the UN Secretariat. It became a specialized agency in 1986. Its headquarters are in Vienna, Austria.

United Nations University is a worldwide research and advanced training institution established by the United Nations (UN). Unlike a traditional university, it has no campus, students, or faculty, and it does not grant degrees. Rather, the university is a central planning agency for networks of cooperating institutions and scholars. The university promotes joint study and the exchange of knowledge to solve global problems. It organizes and coordinates research, training, and information services worldwide. It has three major areas of interest—world hunger, human and social development, and use and management of natural resources.

The UN General Assembly chartered the United Nations University in 1973, and it began operations in 1975. The university chooses its own programmes and the institutions and individuals through which it works. It receives most of its funds from a permanent endowment established by voluntary contributions from members of the UN. The university has headquarters in Tokyo.

United Press International (UPI) is one of the largest privately owned news agencies in the world. It distributes news, photographs, television news film, radio news, and cable television news programming to about 6,000 clients. Its clients include newspapers, radio and television stations, news magazines, and cable television outlets in more than 100 countries. UPI has about 230 bureaus worldwide.

United Press Associations was formed in 1907 by Edward Wyllis Scripps. In the 1930's, United Press established a network of news bureaus throughout the world. In 1958, United Press merged with International News Service to form United Press International. The E. W. Scripps Company sold UPI in 1982 to Media News Corporation. In 1984, the British news agency Reuters purchased UPI's foreign photo service. In 1985, UPI filed for reorganization under U.S. bankruptcy laws. In 1986, UPI was bought by a Mexican publisher and an American businessman. UPI was sold again in 1987, to Info Technology, Inc., but the agency soon faced bankruptcy. In 1992, UPI was bought by the London-based Middle East Broadcasting Centre Ltd.



The United States is a land of great beauty and natural wealth. Its many famous and interesting sights include the Statue of Liberty in New York Harbor, *above left;* quaint cable cars on hilly San Francisco streets, *top right;* and areas of rich farmland in the fertile Midwest, *bottom right.*

United States

United States of America is the third largest country in the world in population and the fourth largest in area. China and India are the only countries with more people. Only Russia, Canada, and China have larger areas. The United States covers the entire midsection of North America, stretching from the Atlantic Ocean in the east to the Pacific Ocean in the west. It also includes Alaska, in the northwest corner of North America; and Hawaii, far out in the Pacific. The United States is often called the *U.S., U.S.A.,* or *America.*

The land of the United States is as varied as it is vast. It ranges from the warm beaches of Florida and Hawaii to the frozen northlands of Alaska, and from the level Midwestern prairies to the snow-capped Rocky Mountains. This huge and beautiful country is rich in natural resources. It has great stretches of some of the most fertile soil on earth, a plentiful water supply and excellent water routes, and large stretches of forests. There are also huge deposits of valuable minerals which lie underneath the ground.

Economically, the United States is one of the world's most highly developed and productive nations. No other country equals the United States in the production of goods and services. Its people enjoy one of the world's highest standards of living.

Until the 1500's, what is now the United States was largely a wilderness. Small groups of Indians lived scattered over the land between the Atlantic and Pacific. Eskimos inhabited what is now Alaska, and Polynesians lived in Hawaii. People in Europe saw in this vast "new world" a chance to build new and better lives. Small groups of Spaniards settled in what is now the Southeastern and Western United States in the 1500's. People from England and some other European countries began settling along and near the East Coast during the 1600's. In 1776, colonists in the East established an independent nation based on freedom and economic opportunity. Through the years, large numbers of people from Europe continued to settle in the United States. In addition, people from almost every other part of the world settled in the country. Except for black Africans brought in as slaves, these *immigrants* came seeking the rights and the opportunities that had become part of the American way of life. As a result of this immigration, the United States today has one of the world's most varied populations. It has been called "a nation of immigrants."

The vast space and resources of the land, the ideals of freedom and economic opportunity, and hard work by the people all helped build the United States into the economic giant it is today. The Americans—as the people are commonly called—also made major contributions in such fields as technology, science, and medicine. Americans developed the mass production system of manufacturing, the electric light bulb, the telephone, and polio vaccine. They also created the skyscraper and such new art forms as jazz and musical comedy.

At times, the U.S. economy has run into difficulty. Even so, it remains one of the most productive systems ever developed. In some cases, groups of Americans have suffered socially and economically from discrimination. But the country's laws have helped many people overcome discrimination and achieve better lives.

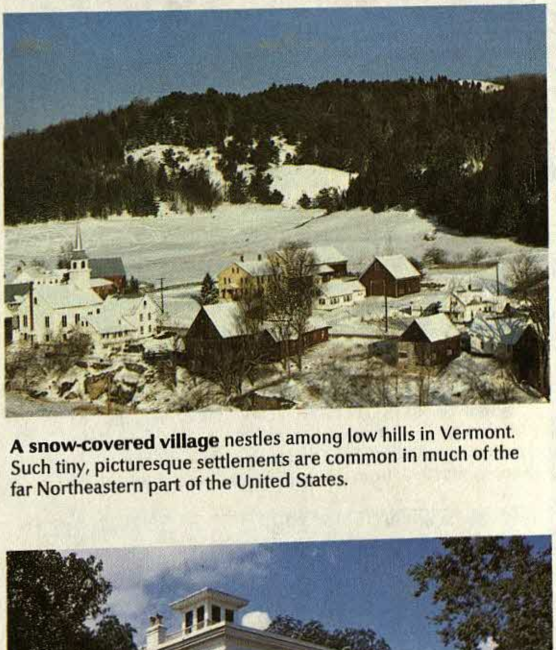
This article discusses the nation's regions, people, way of life, land, climate, and economy. For government and history information, see **United States, Government of the,** and **United States, History of the.**

Political divisions. The United States consists of 50 states and the District of Columbia. The District of Columbia is a piece of land set aside by the federal government for the nation's capital, Washington, D.C. For a list of the states, see the table in this article titled *Facts in brief about the states.*

In area, population, and economic output, some of the states are comparable to many nations. The United States has a federal system of government, which gives the states many powers that national governments have in most other countries. For example, the states have broad control over public education and the establishment of civil and criminal laws.

Regions. The states of the United States, excluding Alaska and Hawaii, are often divided into seven major regions. Each region is made up of states that have similarities in geography, climate, economy, traditions, and history. The regions are: (1) New England, (2) the Middle Atlantic States, (3) the Southern States, (4) the Midwestern States, (5) the Rocky Mountain States, (6) the South-

Giant cactuses in Arizona are symbols of the "wide open spaces" of the Southwest. A warm, dry climate has made the Southwest one of the nation's fastest-growing areas.



A snow-covered village nestles among low hills in Vermont. Such tiny, picturesque settlements are common in much of the far Northeastern part of the United States.

A Southern mansion in Alabama dates from 1853. Originally a private home, it is now a government-owned museum and a reminder of the architecture of the pre-Civil War South.

United States in brief

Capital: Washington, D.C.

Language: English spoken throughout the country, but does not have official status. Spanish second most common language.

Official name: United States of America.

National anthem: "The Star-Spangled Banner."

Largest population centres: (1990 census)

Cities:

New York City (7,322,564)	Philadelphia (1,585,577)
Los Angeles (3,485,398)	San Diego (1,110,549)
Chicago (2,783,726)	Detroit (1,027,974)
Houston (1,630,553)	Dallas (1,006,877)

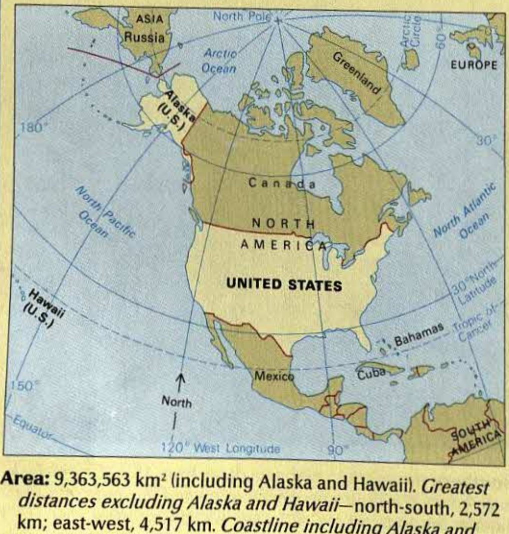
Consolidated metropolitan areas:

New York/Newark/Long Island (18,087,251)
Los Angeles/Anaheim/Riverside (14,531,529)
Chicago/Gary/Kenosha (8,065,633)
San Francisco/Oakland/San Jose (6,253,311)
Philadelphia/Wilmington/Trenton (5,899,345)
Detroit/Ann Arbor (4,665,236)
Boston/Lawrence/Salem (4,171,643)
Washington, D.C. (3,923,574)

Symbols of the United States include the bald eagle, the American flag, and the Great Seal. The Great Seal shows the eagle holding an olive branch and arrows, symbolizing a desire for peace but the ability to wage war. The reverse side bears the Eye of Providence, representing God, and a pyramid dated 1776.

Land and climate

Land: In North America. Includes Alaska and Hawaii. Borders Canada and Mexico, Pacific and Atlantic oceans. Several high mountain ranges in western part of country, including Rockies, Sierra Nevada, and Cascade Range. Coastal plain and low Appalachian Mountains in east. Central area mostly plains. Five Great Lakes in northeast (four shared with Canada). Mississippi-Missouri-Ohio river system drains great central plains. Major rivers include Columbia in northwest, Sacramento in California, Colorado in southwest, Rio Grande in south-central area, and many that flow from the Appalachians to the Atlantic.



Area: 9,363,563 km² (including Alaska and Hawaii). *Greatest distances excluding Alaska and Hawaii*—north-south, 2,572 km; east-west, 4,517 km. *Coastline including Alaska and Hawaii*—19,929 km.

Elevation: *Highest*—6,194 m (Mount McKinley in Alaska). *Lowest*—86 m below sea level (Death Valley in California).

Climate: Pacific Ocean moderates west coast temperatures. Mild summers, cool winters, much rain on northwest coast. Warm and dry in summer, mild with some rain rest of year on California coast. Inland southwest desert and semidesert, very hot in summer. Interior northwest mostly dry with warm summers and cold winters. Warm summers, cold winters, moderate precipitation in northeast and north-central United States. Weather patterns in southeast and south-central areas similar to northeast and north-central but warmer. Alaska is cold, but the southern coast is milder than the rest of the state. Hawaii is tropical.

Government

Form of government: Federal republic.

Chief executive: President (elected by people for 4-year term).

Legislature: Congress of two houses: 100-member Senate, elected for 6-year terms; 435-member House of Representatives, elected for 2-year terms. Though certain constitutional roles differ, houses have approximately equal legislative powers.

Subdivisions: 50 states with local subdivisions.

People

Population: *1990 census*—249,632,692. *1996 estimate*—264,015,000.

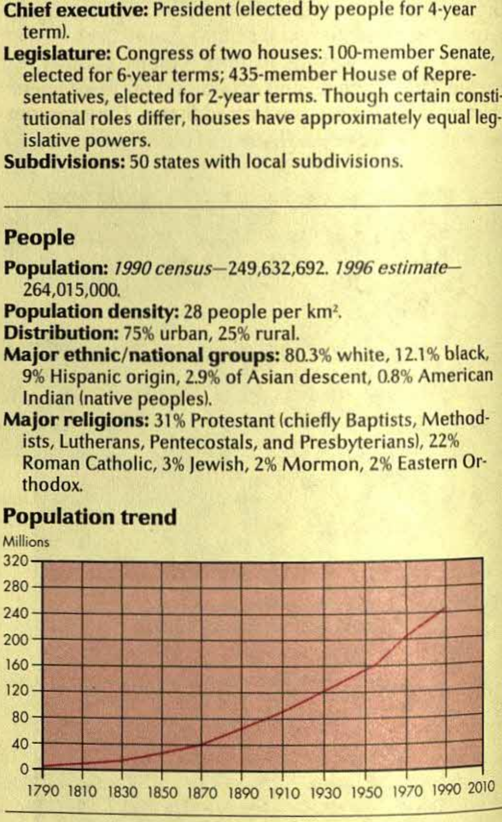
Population density: 28 people per km².

Distribution: 75% urban, 25% rural.

Major ethnic/national groups: 80.3% white, 12.1% black, 9% Hispanic origin, 2.9% of Asian descent, 0.8% American Indian (native peoples).

Major religions: 31% Protestant (chiefly Baptists, Methodists, Lutherans, Pentecostals, and Presbyterians), 22% Roman Catholic, 3% Jewish, 2% Mormon, 2% Eastern Orthodox.

Population trend



Economy

Chief products: *Agriculture*—beef cattle, milk, maize, soybeans, pigs, wheat, chickens and eggs, cotton. *Fishing*—tuna, salmon. *Manufacturing*—foods and beverages, cars, aircraft, communications equipment, printed materials, fabricated metal products, paper, clothing, computers, drugs, wood and wood products. *Mining*—petroleum, natural gas, coal.

Money: *Currency unit*—U.S. dollar. One dollar = 100 cents.

Gross domestic product: *1991 total GDP*—U.S. $5,678,000,000,000. *1991 GDP per capita*—U.S. $22,700.

Foreign trade: *Major exported goods*—motorcars and parts, computers and other office equipment, aircraft, electrical machinery, scientific measuring instruments, telecommunications apparatus, grain, soybeans. *Major imported goods*—petroleum and petroleum products, cars and parts, clothing and shoes, telecommunications equipment, data processing equipment, electrical machinery, iron and steel, seafood.

Highlights

New England Region

Boston. Major cultural, educational, and commercial centre. Historic buildings from the 1700's. Harvard University and Massachusetts Institute of Technology in nearby Cambridge.

Maine coast. Picturesque rocky coast. Fishing villages. Acadia National Park (fjords and tide pools).

Vermont. Charming rural villages. Countryside of farms and forests. Forests especially colourful in autumn.

Middle Atlantic Region

New York City. Largest city in country. Centre of business. For highlights, see **New York City** (New York City in brief).

Niagara Falls (on border with Canada). Niagara River, carrying water from four Great Lakes, plunges over an escarpment more than 50 metres high and more than a kilometre wide.

Philadelphia. Historic city and port. Independence Hall (where Declaration of Independence and U.S. Constitution were signed), Liberty Bell, national mint.

Pennsylvania Dutch country (Lancaster county and surrounding areas). Farm area settled by Germans and Swiss (few Hollanders) in 1600's and 1700's.

Southern Region

Washington, D.C. National capital. For highlights, see **Washington, D.C.** (Washington in brief).

Williamsburg (Virginia). Reconstructed colonial city of 1700's.

Southern Appalachians: Chain of low mountains. Forests with many different species of trees. Great Smoky Mountains National Park (Tennessee and North Carolina).

Atlanta. Cultural and financial hub of southeast. Beautiful in early spring when azaleas and dogwoods bloom.

Florida. Winter holiday state and retirement area. Beaches and fishing along Gulf of Mexico and Atlantic Ocean.

Miami. Resort and commercial centre. Large Cuban population. Near-tropical climate.

Everglades (Florida). Grassland with scattered groves of trees and some cypress swamps. Water birds, alligators, otters.

New Orleans. Settled by French and Spanish in 1700's, white and black Americans in 1800's. French Quarter retains festive colonial French atmosphere; excellent food; jazz.

San Francisco

Farm in Illinois

Midwestern Region

Chicago. Third largest city in country, on shore of Lake Michigan. Noted for architecture; world's tallest building, Sears Tower. Lincoln Park and Brookfield zoos; Art Institute, Museum of Science and Industry, Field Museum of Natural History, Shedd Aquarium.

Detroit. Motor City. Many car assembly plants and parts factories. Greenfield Village, museum of American history in nearby Dearborn; Henry Ford Museum, on same site (historic cars and exhibits of applications of technology).

Cleveland. Major industrial city (steel, machinery, car parts) art museum symphony orchestra.

Minneapolis. "Skyways"—enclosed passageways from building to building above street level in central area—enable pedestrians to avoid cold winter weather. Many parks and small lakes.

"North Woods" (much of northern Wisconsin, northern Michigan, and northern Minnesota). Needleleaf evergreen forests, thousands of clear lakes, abundant wildlife. Fishing, boating.

Saint Louis. Gateway Arch, 192 metres high, commemorates city as gateway to settlement of western United States. Lively waterfront on Mississippi River.

Rocky Mountain Region

Denver. On western edge of Great Plains at an altitude of 5,280 feet (1,609 metres), the "Mile-High City." Rocky Mountains visible to the west.

Colorado Rockies. Ski resorts of Vail and Aspen. Rocky Mountain National Park.

Yellowstone National Park (mostly in Wyoming). Established in 1872 as first U.S. national park. Geysers, hot springs, wildlife (bears, moose, elk, bison). South of Yellowstone is Grand Teton National Park.

Glacier National Park (Montana). Rugged mountains, glaciers, lakes. Bighorn sheep, mountain goats.

Southwestern Region

Phoenix. Booming desert metropolis. Mild winter weather, extremely hot in summer.

Grand Canyon (Arizona). Colorado River has worn a gorge as wide as 30 kilometres and on average 1.6 kilometres deep; canyon walls record 2 billion years of the earth's geological history.

Las Vegas (Nevada). Glittering casinos with slot machines and gaming tables.

Dallas. Financial and fashion centre of Texas. Innovative skyscrapers. original Neiman-Marcus department store.

Houston. Centre of petroleum and petrochemical industries. Lyndon B. Johnson Space Center.

Pacific Coast Region

Seattle. Stands on a neck of land between deep saltwater Puget Sound and freshwater Lake Washington. Snow-capped inactive volcanoes Mount Rainier in the southeast and Mount Baker far in the northeast. Olympic Mountains across Puget Sound to the west.

Oregon coast. Breathtaking scenery of surf crashing against rocky headlands. Occasional sandy coves and dunes. Evergreen forests, much marine life.

San Francisco. On a hilly peninsula between Pacific Ocean and San Francisco Bay. Cable cars. Victorian homes and pastel-painted terraced houses. Vibrant Chinatown; sizable Asian American population. Golden Gate Park: arboretum, several fine museums. Zoo in southwest part of city. Golden Gate suspension bridge to the north across the outlet of San Francisco Bay; Bay Bridge links city with Oakland and Berkeley on east side of bay.

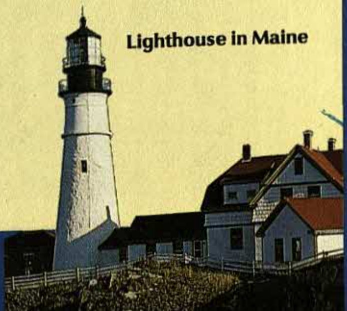
Yosemite National Park (California). Deep valley, originally gouged out by glacier; steep cliffs, waterfalls, granite domes. Abundant wildlife, giant sequoia trees.

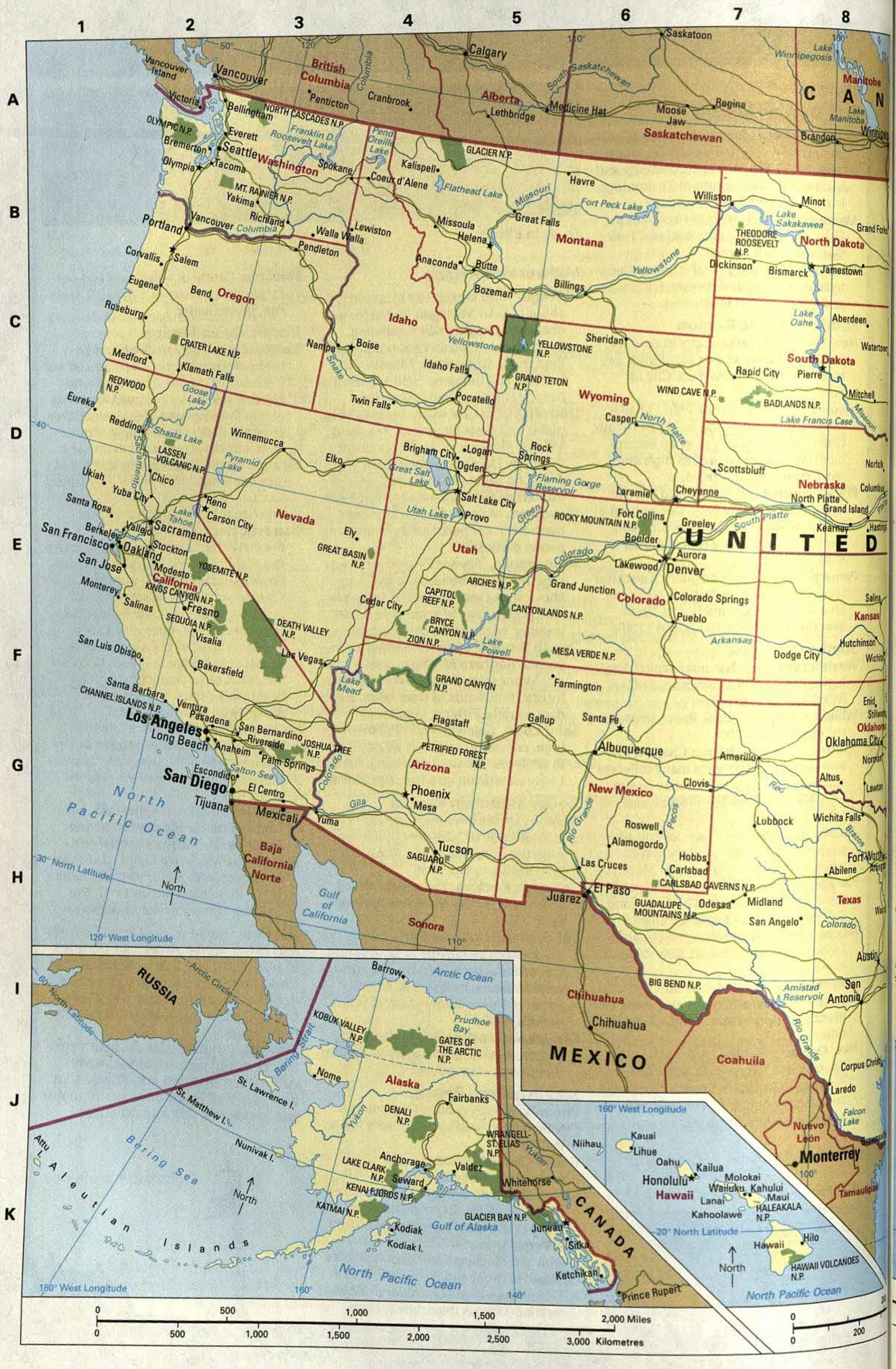
Los Angeles. Second largest U.S. city. Film capital. For highlights, see **Los Angeles** (Los Angeles in brief).

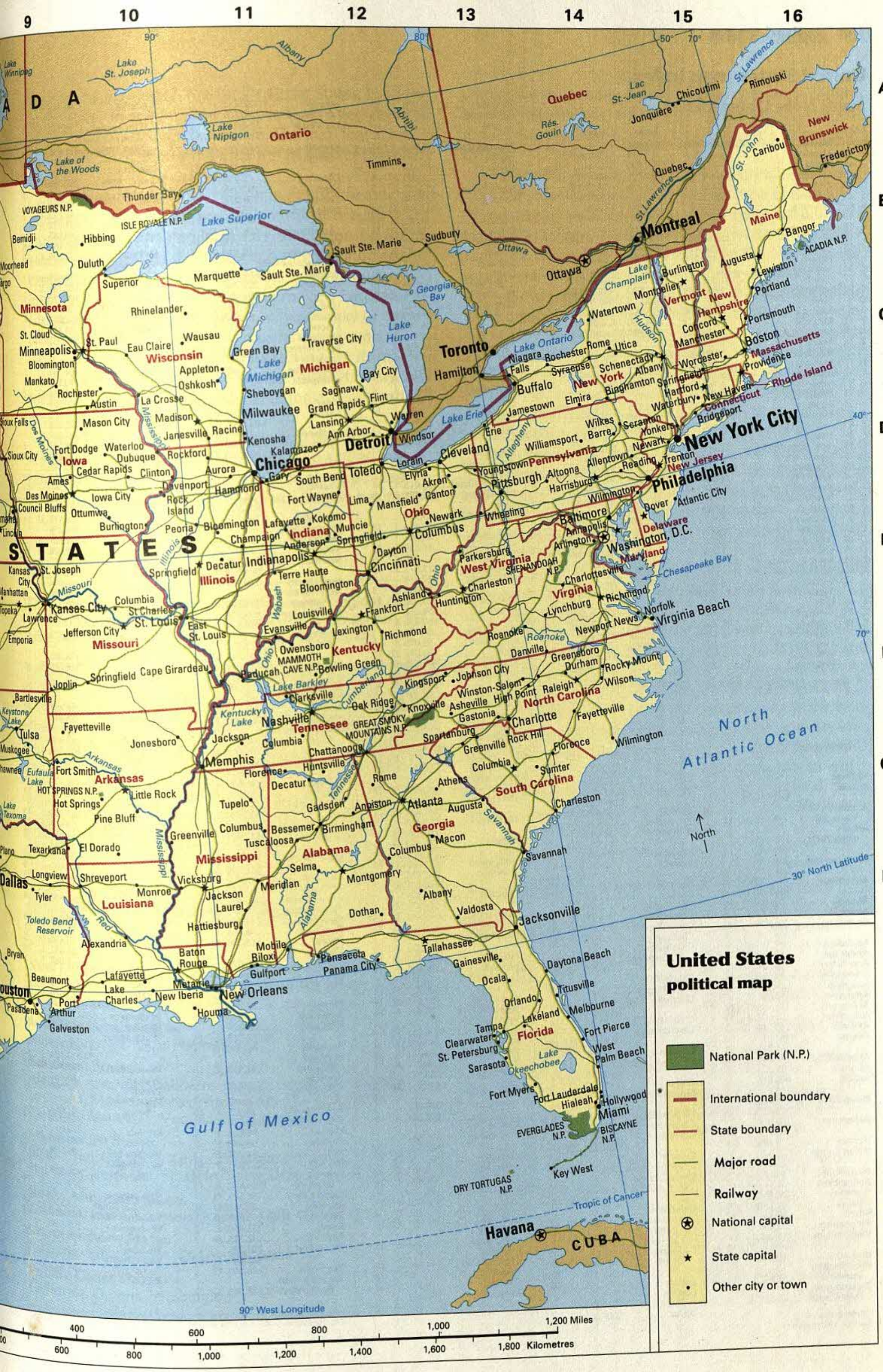
San Diego. Moderate temperature—average temperature for warmest month 22° C., for coldest month 14° C. Zoo. Sea World (marine mammal shows).

Alaska. Sparse population; Eskimos and other native American peoples in north and west. Anchorage a medium-sized city and port. Prince William Sound and Glacier Bay areas have glaciers that flow from nearby mountains.

Hawaii. Tropical islands; lush vegetation. Population includes many Americans of Asian and Polynesian descent. Volcanic cones on all major islands; active volcano (Kilauea).


Lighthouse in Maine


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
K
50°
120°
110°
100°
40°
30° North Latitude
120° West Longitude
Vancouver Island
Vancouver
Victoria
British Columbia
Columbia
Penticton
Cranbrook
Calgary
Alberta
Lethbridge
Medicine Hat
South Saskatchewan
Saskatoon
Moose Jaw
Regina
Saskatchewan
Lake Winnipegosis
Manitoba
Lake Manitoba
Brandon
Winnipeg
C A N
Bellingham
NORTH CASCADES N.P.
OLYMPIC N.P.
Everett
Bremerton
Seattle
Olympia
Tacoma
Washington
Franklin D. Roosevelt Lake
Spokane
Pend Oreille Lake
Coeur d'Alene
GLACIER N.P.
Kalispell
Flathead Lake
MT. RAINIER N.P.
Yakima
Richland
Portland
Vancouver
Columbia
Walla Walla
Lewiston
Pendleton
Missoula
Helena
Missouri
Great Falls
Havre
Fort Peck Lake
Williston
Minot
Lake Sakakawea
THEODORE ROOSEVELT N.P.
Grand Forks
North Dakota
Montana
Anaconda
Butte
Bozeman
Billings
Yellowstone
Dickinson
Bismarck
Jamestown
Corvallis
Salem
Eugene
Bend
Oregon
Roseburg
Idaho
CRATER LAKE N.P.
Medford
Klamath Falls
Nampa
Boise
Snake
Yellowstone Lake
YELLOWSTONE N.P.
Sheridan
Lake Oahe
Aberdeen
Watertown
South Dakota
Pierre
Rapid City
WIND CAVE N.P.
BADLANDS N.P.
Mitchell
Missouri
Lake Francis Case
REDWOOD N.P.
Goose Lake
Idaho Falls
GRAND TETON N.P.
Wyoming
Eureka
Twin Falls
Pocatello
Casper
North Platte
Redding
Shasta Lake
Sacramento
LASSEN VOLCANIC N.P.
Winnemucca
Pyramid Lake
Elko
Brigham City
Logan
Ogden
Great Salt Lake
Rock Springs
Scottsbluff
Norfolk
Ukiah
Chico
Yuba City
Flaming Gorge Reservoir
Laramie
Cheyenne
Nebraska
Columbus
Santa Rosa
Reno
Lake Tahoe
Carson City
Nevada
Salt Lake City
Utah Lake
Provo
Green
North Platte
Grand Island
Fort Collins
Greeley
South Platte
Kearney
Hastings
Berkeley
Vallejo
Sacramento
ROCKY MOUNTAIN N.P.
San Francisco
Oakland
Stockton
Ely
Boulder
San Jose
Modesto
GREAT BASIN N.P.
Utah
Colorado
Aurora
Lakewood
Denver
U N I T E D
YOSEMITE N.P.
Monterey
California
KINGS CANYON N.P.
Salinas
Fresno
ARCHES N.P.
Grand Junction
Colorado
Colorado Springs
Salina
Kansas
SEQUOIA N.P.
DEATH VALLEY N.P.
Cedar City
CAPITOL REEF N.P.
CANYONLANDS N.P.
Pueblo
Visalia
BRYCE CANYON N.P.
ZION N.P.
Lake Powell
Arkansas
Hutchinson
Wichita
San Luis Obispo
Las Vegas
MESA VERDE N.P.
Dodge City
Bakersfield
Lake Mead
GRAND CANYON N.P.
Farmington
Santa Barbara
CHANNEL ISLANDS N.P.
Ventura
Pasadena
Los Angeles
Long Beach
San Bernardino
Riverside
Anaheim
Palm Springs
JOSHUA TREE N.P.
Flagstaff
Gallup
Santa Fe
Enid
Stillwater
Oklahoma
Oklahoma City
PETRIFIED FOREST N.P.
Albuquerque
Amarillo
Norman
Escondido
Salton Sea
Colorado
Arizona
San Diego
El Centro
Phoenix
Mesa
New Mexico
Clovis
Altus
Lawton
Red
North Pacific Ocean
Tijuana
Mexicali
Yuma
Gila
Rio Grande
Pecos
Roswell
Lubbock
Wichita Falls
Brazos
Alamogordo
Baja California Norte
Tucson
SAGUARO N.P.
Las Cruces
Hobbs
Carlsbad
Fort Worth
Arlington
Abilene
North
Gulf of California
El Paso
Juárez
CARLSBAD CAVERNS N.P.
GUADALUPE MOUNTAINS N.P.
Odessa
Midland
Texas
San Angelo
Colorado
Sonora
Austin
RUSSIA
Arctic Circle
60° North Latitude
Bering Strait
Barrow
Arctic Ocean
KOBUK VALLEY N.P.
Prudhoe Bay
GATES OF THE ARCTIC N.P.
BIG BEND N.P.
Amistad Reservoir
San Antonio
Chihuahua
Chihuahua
Nome
Alaska
St. Lawrence I.
MEXICO
Coahuila
Rio Grande
Corpus Christi
St. Matthew I.
Yukon
DENALI N.P.
Fairbanks
Laredo
Falcon Lake
160° West Longitude
Kauai
Lihue
Niihau
Oahu
Kailua
Honolulu
Hawaii
Molokai
Wailuku
Kahului
Maui
HALEAKALA N.P.
Lanai
Kahoolawe
Nuevo León
Monterrey
Brownsville
Tamaulipas
WRANGELL-ST. ELIAS N.P.
Yukon
Attu I.
Aleutian Islands
Bering Sea
Nunivak I.
North
Anchorage
LAKE CLARK N.P.
Seward
Valdez
KENAI FJORDS N.P.
Whitehorse
CANADA
KATMAI N.P.
GLACIER BAY N.P.
Juneau
Kodiak
Kodiak I.
Gulf of Alaska
Sitka
Ketchikan
Prince Rupert
North Pacific Ocean
20° North Latitude
North
Hilo
Hawaii
HAWAII VOLCANOES N.P.
North Pacific Ocean
180° West Longitude
160°
140°
0
500
1,000
1,500
2,000 Miles
0
500
1,000
1,500
2,000
2,500
3,000 Kilometres
0
200


9
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
K
90°
80°
70°
50°
40°
30° North Latitude
90° West Longitude
Tropic of Cancer
North
North Atlantic Ocean
Gulf of Mexico
ADA
STATES
Ontario
Quebec
New Brunswick
Fredericton
Rimouski
Chicoutimi
Jonquière
Lac St.-Jean
Rés. Gouin
St. Lawrence
Quebec
Montreal
Ottawa
Toronto
Hamilton
Timmins
Sudbury
Sault Ste. Marie
Thunder Bay
Lake Nipigon
Lake St. Joseph
Albany
Abitibi
Lake Winnipeg
Lake of the Woods
VOYAGEURS N.P.
ISLE ROYALE N.P.
Lake Superior
Lake Michigan
Lake Huron
Georgian Bay
Lake Erie
Lake Ontario
Lake Champlain
Maine
Caribou
St. John
Bangor
ACADIA N.P.
Augusta
Lewiston
Portland
Vermont
Burlington
Montpelier
New Hampshire
Concord
Manchester
Portsmouth
Massachusetts
Boston
Worcester
Springfield
Providence
Rhode Island
Connecticut
Hartford
Waterbury
New Haven
Bridgeport
New York
New York City
Yonkers
Hudson
Watertown
Rome
Utica
Syracuse
Rochester
Niagara Falls
Buffalo
Schenectady
Albany
Binghamton
Elmira
Jamestown
Pennsylvania
Erie
Allegheny
Williamsport
Wilkes-Barre
Scranton
Allentown
Reading
Harrisburg
Altoona
Pittsburgh
Youngstown
Philadelphia
New Jersey
Trenton
Newark
Atlantic City
Wilmington
Dover
Delaware
Baltimore
Annapolis
Washington, D.C.
Arlington
Maryland
Chesapeake Bay
Virginia
Charlottesville
Richmond
Lynchburg
Roanoke
Norfolk
Virginia Beach
Newport News
West Virginia
SHENANDOAH N.P.
Parkersburg
Wheeling
Charleston
Huntington
Ohio
Cleveland
Lorain
Elyria
Akron
Canton
Mansfield
Toledo
Lima
Newark
Columbus
Dayton
Springfield
Cincinnati
Michigan
Detroit
Windsor
Warren
Ann Arbor
Lansing
Flint
Saginaw
Bay City
Grand Rapids
Kalamazoo
Traverse City
Marquette
Sault Ste. Marie
Indiana
South Bend
Fort Wayne
Gary
Hammond
Kokomo
Lafayette
Muncie
Anderson
Indianapolis
Terre Haute
Bloomington
Evansville
Wabash
Illinois
Chicago
Aurora
Rockford
Peoria
Bloomington
Champaign
Decatur
Springfield
Rock Island
East St. Louis
Wisconsin
Superior
Rhinelander
Wausau
Eau Claire
Green Bay
Appleton
Oshkosh
Sheboygan
Milwaukee
Madison
Janesville
Racine
Kenosha
La Crosse
Minnesota
Duluth
Hibbing
Bemidji
Moorhead
St. Cloud
Minneapolis
St. Paul
Bloomington
Mankato
Rochester
Austin
Iowa
Mason City
Fort Dodge
Waterloo
Dubuque
Sioux City
Sioux Falls
Des Moines
Cedar Rapids
Clinton
Davenport
Ames
Iowa City
Council Bluffs
Ottumwa
Burlington
Lincoln
Missouri
Kansas City
St. Joseph
Topeka
Lawrence
Emporia
Manhattan
Columbia
St. Charles
St. Louis
Jefferson City
Springfield
Joplin
Cape Girardeau
Kentucky
Louisville
Lexington
Frankfort
Richmond
Ashland
Owensboro
Paducah
MAMMOTH CAVE N.P.
Bowling Green
Lake Barkley
Kentucky Lake
Cumberland
Tennessee
Clarksville
Nashville
Jackson
Columbia
Memphis
Oak Ridge
Knoxville
Kingsport
Johnson City
Chattanooga
GREAT SMOKY MOUNTAINS N.P.
North Carolina
Winston-Salem
Greensboro
Durham
Raleigh
High Point
Asheville
Gastonia
Charlotte
Rocky Mount
Wilson
Fayetteville
Wilmington
South Carolina
Spartanburg
Greenville
Rock Hill
Columbia
Florence
Sumter
Charleston
Georgia
Athens
Atlanta
Augusta
Rome
Macon
Columbus
Savannah
Albany
Valdosta
Alabama
Huntsville
Florence
Decatur
Gadsden
Anniston
Birmingham
Bessemer
Tuscaloosa
Selma
Montgomery
Dothan
Mobile
Mississippi
Tupelo
Columbus
Greenville
Vicksburg
Jackson
Meridian
Laurel
Hattiesburg
Biloxi
Gulfport
Louisiana
Shreveport
Monroe
Alexandria
Baton Rouge
Lafayette
Lake Charles
New Iberia
Metairie
New Orleans
Houma
Toledo Bend Reservoir
Red
Arkansas
Fayetteville
Jonesboro
Fort Smith
Little Rock
Hot Springs
HOT SPRINGS N.P.
Pine Bluff
El Dorado
Texarkana
Oklahoma
Bartlesville
Tulsa
Muskogee
Keystone Lake
Eufaula Lake
Lake Texoma
Texas
Dallas
Plano
Longview
Tyler
Bryan
Houston
Pasadena
Beaumont
Port Arthur
Galveston
Florida
Pensacola
Panama City
Tallahassee
Jacksonville
Gainesville
Daytona Beach
Ocala
Titusville
Orlando
Melbourne
Lakeland
Tampa
Clearwater
St. Petersburg
Sarasota
Fort Pierce
West Palm Beach
Lake Okeechobee
Fort Myers
Fort Lauderdale
Hollywood
Hialeah
Miami
EVERGLADES N.P.
BISCAYNE N.P.
Key West
DRY TORTUGAS N.P.
Havana
CUBA
Mississippi
Missouri
Ohio
Tennessee
Savannah
Alabama
Roanoke
Des Moines
United States political map
National Park (N.P.)
International boundary
State boundary
Major road
Railway
National capital
State capital
Other city or town
400
600
800
1,000
1,200 Miles
600
800
1,000
1,200
1,400
1,600
1,800 Kilometres

United States map index

States of the United States

Map key	Name	Population	Area In km²	Capital
H 12	Alabama	4,062,608	133,915	Montgomery
J 4	Alaska	551,947	1,530,700	Juneau
G 4	Arizona	3,677,985	295,260	Phoenix
G 10	Arkansas	2,362,239	137,754	Little Rock
E 2	California	29,839,250	411,049	Sacramento
E 6	Colorado	3,307,912	269,595	Denver
D 15	Connecticut	3,295,669	12,977	Hartford
E 15	Delaware	668,696	5,295	Dover
I 14	Florida	13,003,362	151,939	Tallahassee
G 13	Georgia	6,508,419	152,576	Atlanta
K 6	Hawaii	1,115,274	16,759	Honolulu
C 4	Idaho	1,011,986	216,432	Boise
E 11	Illinois	11,466,682	145,934	Springfield
E 12	Indiana	5,564,228	93,720	Indianapolis
D 9	Iowa	2,787,424	145,753	Des Moines
F 8	Kansas	2,485,600	213,098	Topeka
F 12	Kentucky	3,698,969	104,660	Frankfort
H 10	Louisiana	4,238,216	123,677	Baton Rouge
B 16	Maine	1,233,223	86,156	Augusta
E 14	Maryland	4,798,622	27,092	Annapolis
C 16	Massachusetts	6,029,051	21,456	Boston
C 12	Michigan	9,328,784	151,586	Lansing
C 9	Minnesota	4,387,029	218,601	St. Paul
H 11	Mississippi	2,586,443	123,515	Jackson
F 10	Missouri	5,137,804	180,516	Jefferson City
B 5	Montana	803,655	380,848	Helena
E 8	Nebraska	1,584,617	200,350	Lincoln
E 3	Nevada	1,206,152	286,532	Carson City
C 15	New Hampshire	1,113,915	24,032	Concord
D 15	New Jersey	7,748,634	20,169	Trenton
G 6	New Mexico	1,521,779	314,925	Santa Fe
D 14	New York	18,044,505	127,189	Albany
F 14	North Carolina	6,657,630	136,413	Raleigh
B 8	North Dakota	641,364	183,119	Bismarck
E 12	Ohio	10,887,325	107,044	Columbus
G 8	Oklahoma	3,157,604	181,186	Oklahoma City
C 2	Oregon	2,853,733	251,419	Salem
D 14	Pennsylvania	11,924,710	117,348	Harrisburg
D 16	Rhode Island	1,005,984	3,140	Providence
G 13	South Carolina	3,505,707	80,582	Columbia
C 8	South Dakota	699,999	199,730	Pierre
G 12	Tennessee	4,896,641	109,152	Nashville
H 8	Texas	17,059,805	691,030	Austin
E 4	Utah	1,727,784	219,889	Salt Lake City
C 15	Vermont	564,964	24,900	Montpelier
E 14	Virginia	6,216,568	105,586	Richmond
B 3	Washington	4,887,941	176,479	Olympia
E 13	West Virginia	1,801,625	62,759	Charleston
C 10	Wisconsin	4,906,745	145,436	Madison
D 6	Wyoming	455,975	253,326	Cheyenne

All states shown here are the subject of a separate article in *World Book.*

Cities and towns

Abilene	106,654	H 8
Akron	223,019 *657,575	D 13
Albany (Georgia)	78,122	H 13
Albany (New York)	101,082 *874,304	C 15
Albuquerque	384,736 *480,577	G 6
Allentown	105,090 *686,688	D 14
Altoona	51,881	D 14
Amarillo	157,615	G 7
Anaheim	266,406 *2,410,556	G 2
Anchorage	226,338	K 4
Anderson	50,459	E 12
Ann Arbor	109,592	D 12
Annapolis	33,187	E 14
Anniston	26,623	G 12
Appleton	65,695	C 11
Arlington	170,396	E 14
Asheville	61,607	F 13
Athens	45,734	G 13
Atlanta	394,017 *2,833,511	G 12
Atlantic City	37,986	F 15
Augusta	21,325	B 16
Austin	465,622 *781,572	I 8
Bakersfield	174,820 *543,477	F 2
Baltimore	736,014 *2,382,172	E 14
Barrow	3,469	I 4
Baton Rouge	219,531 *528,264	I 11
Beaumont	114,323	I 9
Bellingham	52,179	A 2
Berkeley	102,724	E 1
Billings	81,151	C 6
Biloxi	46,319	H 11
Binghamton	53,608	D 14
Birmingham	265,968 *907,810	G 12
Bismarck	49,256	C 8
Bloomington (Indiana)	51,972	E 11
Bloomington (Minnesota)	86,335	C 9
Boise	125,738	C 4
Boston	574,283 *2,870,669	C 15
Boulder	76,685	E 6
Bremerton	38,142	A 2
Bridgeport	141,686 *443,722	D 15
Brownsville	98,962	I 8
Buffalo	328,123 *968,352	D 13
Burlington	39,127	C 15
Canton	84,161	D 13
Carson City	40,443	E 2
Casper	46,742	D 6
Cedar Rapids	108,751	D 10
Champaign	63,502	E 11
Charleston (S. Carolina)	80,414 *506,875	G 14
Charleston (W. Virginia)	57,287	E 13
Charlotte	395,934 *1,162,093	G 13
Charlottesville	40,341	E 14
Chattanooga	152,466 *433,210	G 12
Cheyenne	50,008	E 6
Chicago	2,783,726 *6,069,974	D 11
Chico	40,079	D 2
Cincinnati	364,040 *1,452,645	E 12
Clarksville	75,498	F 12
Clearwater	98,784	I 13
Cleveland	505,616 *1,831,122	D 13
Colorado Springs	281,140	E 6
Columbia (S. Carolina)	98,052 *453,331	G 14
Columbia (Missouri)	69,101	E 10
Columbus (Georgia)	179,278	H 12
Columbus (Ohio)	632,910 *1,377,419	E 12
Concord	36,006	C 15
Corpus Christi	257,453	I 8
Dallas	1,006,877 *2,553,362	H 9
Danville	53,056	F 14
Davenport	95,333	E 10
Dayton	182,044 *951,270	E 12
Daytona Beach	61,921	I 14
Decatur	83,885	E 11
Denver	467,610 *1,622,980	E 6
Des Moines	193,187	E 9
Detroit	1,027,974 *4,382,299	D 12
Dothan	53,589	H 12
Dover	27,630	E 15
Dubuque	57,546	D 10
Duluth	85,493	B 10
Durham	136,611	F 14
East St. Louis	40,944	F 10
Eau Claire	56,856	C 10
El Paso	515,342 *591,610	H 6
Elyria	56,746	D 13
Erie	108,718	D 13
Escondido	108,635	G 2
Eugene	112,669	C 2
Evansville	126,272	F 11
Everett	69,961	A 2
Fairbanks	30,843	J 4
Fargo	74,111	C 9
Fayetteville	75,695	F 14
Flagstaff	45,857	G 4
Flint	140,761 *430,459	D 13
Florence (Alabama)	36,426	G 11
Florence (S. Carolina)	29,813	G 14
Fort Collins	87,758	E 6
Fort Lauderdale	149,377 *1,255,488	J 14
Fort Myers	45,206	J 14
Fort Pierce	36,830	I 14
Fort Smith	72,798	G 9
Fort Wayne	173,072	E 12
Fort Worth	447,619 *1,332,053	H 8
Frankfort	25,968	F 12
Fresno	354,202 *667,490	F 2
Gainesville	84,770	I 13
Galveston	59,070	I 9
Gary	116,646	D 11
Gary-Hammond	*604,526	D 11
Grand Rapids	189,126 *688,399	D 12
Great Falls	55,097	B 5
Greeley	60,536	E 6
Green Bay	96,466	C 11
Greensboro	183,521	F 14
Greensboro-Winston-Salem	*942,091	F 14
Greenville	58,282	G 13
Greenville-Spartanburg	*640,861	G 13
Harrisburg	52,376 *587,986	D 14
Hartford	139,739 *767,841	D 15
Helena	24,569	B 5
Hilo	37,808	K 8
Hollywood	121,697	J 14
Honolulu	365,272 *836,231	K 7
Houston	1,630,553 *3,301,937	K 7
Huntington	54,844	E 13
Huntsville	159,789	G 12
Indianapolis	731,327 *1,249,822	E 12
Iowa City	59,738	D 10
Jackson	196,637	H 11
Jacksonville	672,971 *906,727	H 13
Janesville	52,133	D 11
Jefferson City	35,481	F 10
Johnson City-Kingsport	*436,047	F 13
Joplin	40,961	F 9
Juneau	26,751	K 5
Kailua	36,818	K 7
Kalamazoo	80,277 *429,453	D 12
Kansas City (Kansas)	149,767 *604,884	E 9
Kansas City (Missouri)	435,146 *961,396	E 9
Kenosha	80,352	D 11
Ketchikan	8,263	K 5
Key West	24,832	J 14
Knoxville	165,121 *604,816	F 13
Kodiak	6,365	K 4
La Crosse	51,003	C 10
Lafayette (Indiana)	43,764	E 11
Lafayette (Louisiana)	94,440	I 10
Lake Charles	70,580	I 10
Lakeland	70,576	I 13
Lansing	127,321 *432,674	D 12
Laredo	122,899	J 8
Las Cruces	62,126	H 5
Las Vegas	258,295 *741,459	F 3
Lawton	80,561	G 8
Lexington	225,366 *405,936	F 12
Lihue	5,536	J 6
Lima	45,549	E 12
Lincoln	191,972	E 9
Little Rock	175,795 *513,117	G 10
Long Beach	429,433	G 2
Lorain	71,245	D 13
Los Angeles	3,485,398	G 2
Los Angeles-Long Beach	*8,863,164	G 2
Louisville	269,063 *952,662	F 12
Lubbock	186,206	G 7
Lynchburg	66,049	F 14
Macon	106,612	H 13
Madison	191,262	D 11
Manchester	99,567	C 15
Mansfield	50,627	E 12
Melbourne	59,646	I 14
Memphis	610,337 *981,747	G 11
Mesa	288,091	G 4
Miami	358,548 *1,937,094	J 14
Midland	89,443	H 7
Milwaukee	628,088 *1,432,149	D 11
Minneapolis	368,383 *2,464,124	C 9
Missoula	42,918	B 4
Mobile	196,278 *476,923	H 11
Modesto	164,730	E 2
Montgomery	187,106	H 12
Montpelier	8,247	C 15
Muncie	71,035	E 12
Nashville	510,784 *985,026	F 12
New Haven	130,474	D 15
New Haven-Meriden	*530,180	D 15
New Orleans	496,938 *1,238,816	I 11
New York City	7,322,564 *8,546,846	D 15
Newark	275,221 *1,824,321	D 15
Newport News	170,045	F 15
Niagara Falls	61,840	C 13
Nome	3,500	J 3
Norfolk	393,069	F 15
Norfolk-Virginia Beach	*1,396,107	F 15
Norman	80,071	G 8
Oakland	372,242 *2,082,914	E 1
Odessa	89,699	H 7
Ogden	63,909	D 4
Oklahoma City	444,719 *958,839	G 8
Olympia	33,840	A 2
Omaha	335,795 *618,262	E 9
Orlando	164,693 *1,072,748	I 14
Oshkosh	55,006	C 11
Owensboro	53,549	F 11
Palm Springs	40,181	G 2
Parkersburg	33,862	E 13
Pasadena	131,591	G 2
Pensacola	58,165	I 12
Peoria	113,504	E 11
Philadelphia	1,585,577 *4,856,881	D 15
Phoenix	983,403 *2,122,101	G 4
Pierre	12,906	C 8
Pine Bluff	57,140	G 10
Pittsburgh	369,879 *2,056,705	E 13
Pocatello	46,080	D 4
Portland (Maine)	64,358	C 16
Portland (Oregon)	437,319 *1,239,842	B 2
Portsmouth	25,925	C 16
Providence	160,728	D 15
Provo	86,835	E 4
Pueblo	98,640	F 6
Racine	84,298	D 11
Raleigh	207,951	F 14
Raleigh-Durham	*735,480	F 14
Rapid City	54,523	D 7
Reading	78,380	D 14
Redding	66,462	D 2
Reno	133,850	E 2
Richland	32,315	B 3
Richmond	203,056 *865,640	E 14
Riverside	226,505	G 2
Riverside-San Bernardino	*2,588,793	G 2
Roanoke	96,397	F 13
Rochester (Minnesota)	70,745	D 10
Rochester (New York)	231,636 *1,002,410	C 14
Rockford	139,426	D 11
Sacramento	369,365 *1,481,102	E 2
Saginaw	69,512	D 12
St. Cloud	48,812	C 9
St. Joseph	71,852	E 9
St. Louis	396,685 *2,444,099	F 10
St. Paul	272,235	C 10
St. Petersburg	238,629	I 13
Salem	107,786	B 2
Salinas	108,777	E 1
Salt Lake City	159,936 *1,072,227	E 4
San Angelo	84,474	H 7
San Antonio	935,933 *1,302,099	I 8
San Bernardino	164,164	G 2
San Diego	1,110,549 *2,498,016	G 2
San Francisco	723,959 *1,603,678	E 1
San Jose	782,248 *1,497,577	E 1
Santa Barbara	85,571	F 2
Santa Fe	55,859	G 6
Santa Rosa	113,313	E 1
Sarasota	50,961	J 13
Savannah	137,560	H 13
Schenectady	65,566	C 15
Scranton	81,805 *734,175	D 14
Seattle	516,259 *1,972,961	A 2
Sheboygan	49,676	D 11
Shreveport	198,525	H 10
Sioux City	80,505	D 9
Sioux Falls	100,814	D 9
Sitka	8,588	K 5
South Bend	105,511	D 11
Spokane	177,196	B 3
Springfield (Illinois)	105,227	E 11
Springfield (Mass.)	156,983 *529,519	C 15
Springfield (Missouri)	140,494	F 10
Springfield (Ohio)	70,487	E 12
Stockton	210,943 *480,628	E 2
Syracuse	163,860 *659,864	C 14
Tacoma	176,664 *576,203	A 2
Tallahassee	124,773	H 13
Tampa	280,015	I 13
Tampa-St. Petersburg	*2,067,959	I 13
Terre Haute	57,483	E 11
Texarkana	31,656	H 9
Toledo	332,943 *614,128	D 12
Topeka	119,883	E 9
Trenton	88,675	D 15
Tucson	405,390 *666,880	H 4
Tulsa	367,302 *708,954	G 9
Tuscaloosa	77,759	H 11
Tyler	75,450	H 9
Utica	68,637	C 14
Valdez	4,068	K 4
Virginia Beach	393,069	F 15
Visalia	75,636	F 2
Waco	103,590	H 8
Wailuku	10,688	K 7
Warren	144,864	D 11
Washington D.C.	606,900 *3,923,574	E 14
Waterbury	108,961	D 15
Waterloo	66,467	D 10
Wausau	37,060	C 10
West Palm Beach	67,643 *863,518	J 14
Wichita	304,011 *485,270	F 8
Wichita Falls	96,259	G 8
Wilmington (Delaware)	71,529 *578,587	E 14
Wilmington (N. Carolina)	55,530	G 14
Winston-Salem	143,485	F 13
Worcester	169,659 *436,905	C 15
Yakima	54,827	B 3
Youngstown	95,732	D 13
Yuma	54,923	G 3

*Metropolitan area
Source: 1990 census

western States, and (7) the Pacific Coast States. For a list of the states in each region, see the table titled *Regions of the United States* in this article. The map that accompanies the table shows the location of each of these regions.

New England is a small region in the northeast corner of the country that is known for picturesque rural villages, numerous fishing harbours, and colourful autumn scenery. New England was the nation's first industrial centre, and manufacturing is still its leading source of income. Industrial cities dot southern New England. Much of the region's land is too hilly or rocky to grow crops. But New England produces large amounts of dairy and poultry products and is famous for its maple syrup. Many tourists visit the region to see its many historic sites—especially those from colonial times—and to enjoy its natural beauty.

Many New Englanders, especially in the rural north, are descendants of English Puritans who settled the region during the 1600's. The more densely populated southern section of the New England Region has people who come from many different backgrounds, including blacks, Irish, Italians, and French Canadians. The southern section includes Boston, New England's largest city by far.

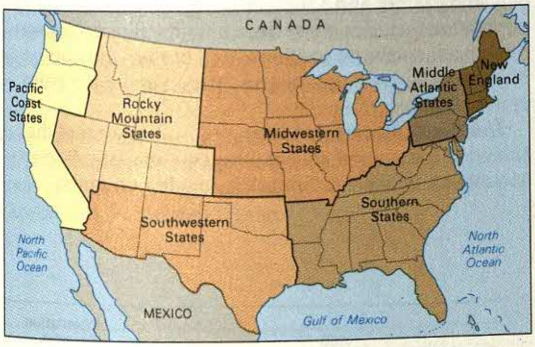
The Middle Atlantic States Region stretches inland from the Atlantic Ocean southwest of New England. Deepwater harbours help make the region a major centre of international trade. The busiest harbour is at New York City, the largest city in the United States. Factories in and near such Middle Atlantic cities—in order of size—as New York City, Philadelphia, Pittsburgh, Buffalo, and Newark produce a wide variety of goods. Coal mining and related industries are important economic activities in the western part of the Middle Atlantic States Region. Farms dot hillsides and fertile plains in various parts of the region. Forested mountains, sandy seashores, scenic lakes and rivers, historic sites, and big-city attractions draw many visitors to the region.

The Middle Atlantic States Region ranks as the nation's most densely populated area. Its urban population includes people of varied European backgrounds, and large groups of people of black African, Latin-American, and Asian ancestry. Many of the region's rural dwellers are of British descent.

The Southern States Region is an area of rolling hills, mountains, and plains bordered by broad beaches along the Atlantic Ocean and the Gulf of Mexico. Until the mid-1900's, the region's economy was based heavily on agriculture. Such warm-weather crops as sugar cane, tobacco, and—especially—cotton contributed greatly to the economy. Agriculture has retained importance in the South. But an industrial boom that began in the mid-1900's has greatly increased manufacturing and has improved the balance of the region's economy. Tourists flock to coastal resorts in the South—especially in winter, when temperatures are usually relatively mild. Baltimore is the largest city of the Southern States Region.

Regions of the United States

The map below shows the location of the seven regions of the continental United States that are discussed in this section. The table below the map lists the states within each region.



New England
Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

Middle Atlantic States
New Jersey, New York, Pennsylvania

Southern States
Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia

Midwestern States
Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin

Rocky Mountain States
Colorado, Idaho, Montana, Nevada, Utah, Wyoming

Southwestern States
*Arizona, *New Mexico, Oklahoma, Texas

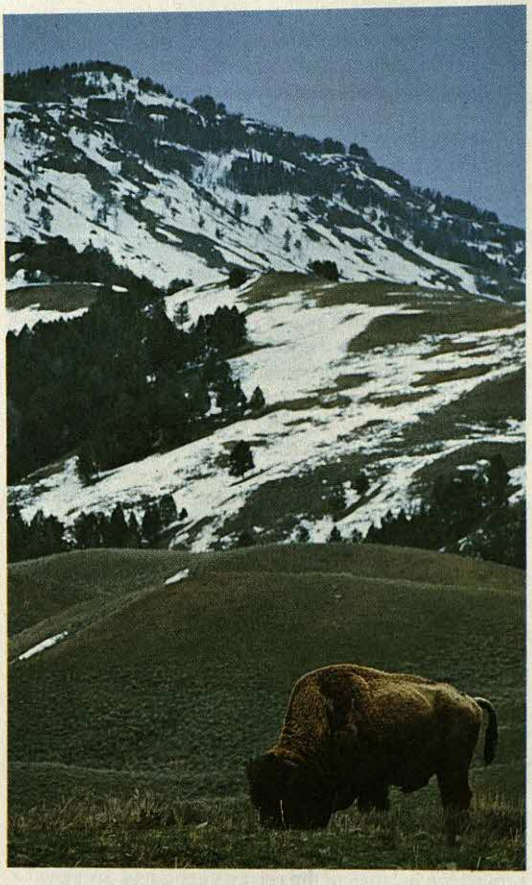
Pacific Coast States
California, Oregon, Washington

*Arizona and New Mexico are often grouped with the Rocky Mountain States.

Main outlying areas of the United States

Name	Acquired	Status
American Samoa	*	Unorganized unincorporated territory
Baker Island and Jarvis Island	1856	Unincorporated territory
Guam	1898	Organized unincorporated territory
Howland Island	1856	Unincorporated possession
Johnston Island and Sand Island	1858	Unincorporated territory
Kingman Reef	1922	Unincorporated territory
Midway Island	1867	Unincorporated territory
Northern Mariana Islands	1947	Commonwealth
Palmyra Island	1898	Unincorporated possession
Puerto Rico	1898	Commonwealth
Trust Territory of the Pacific Islands	1947	UN trust territory (U.S. administration)
Virgin Islands of the United States	1917	Organized unincorporated territory
Wake Island	1898	Unincorporated possession

*Acquired in stages between 1900 and 1925.



The Rocky Mountain States Region includes the scenic Yellowstone National Park, located chiefly in Wyoming.

Jacksonville, Memphis, Washington, D.C., Nashville, New Orleans, and Charlotte rank next in size. Washington, D.C., is not part of a state, but it is in the Southern States Region.

Large numbers of Southerners are descended from early English, Irish, and Scottish immigrants. From the 1600's to the 1800's, many black Africans were brought to the region to work on plantations as slaves. Today, blacks form a large minority group in the Southern States Region. Many Southerners have a strong sense of regional loyalty and take pride in the South's history and traditions.

The Midwestern States Region is a vast area of generally flat land that covers much of the centre of the United States. The Midwest is famous for its large stretches of fertile soil. Farms in the region produce enormous quantities of maize, wheat, and other crops; and also dairy products and livestock. In addition, the Midwest has a number of large industrial cities. The cities include, in order of size, Chicago, Detroit, Indianapolis, Columbus, and Milwaukee.

The Mississippi River system, the Great Lakes, and many railways give the region an excellent transportation network. Lakes and rivers—some set among rolling hills and rugged bluffs—provide numerous recreation areas there.

The Midwestern States Region has a varied population. Its rural areas include large groups of descendants of settlers from Germany, Great Britain, Norway, Sweden, and eastern and southern Europe. The region's city population includes many descendants of people who came from northern, southern, and eastern Europe. Blacks make up a large minority group in the big cities of the Midwest.

The Rocky Mountain States Region lies west of the Midwest. It is named after the rugged, majestic Rocky Mountains, which cut through it. In addition to the

Facts in brief about the states

State	Capital	Area (km^2)	Rank in area	Population*	1980 Population†	Rank in pop.‡	Population density‡ (km^2)
Alabama	Montgomery	133,915	29	4,062,608	3,893,978	22	30
Alaska	Juneau	1,530,700	1	551,947	401,851	49	0.4
Arizona	Phoenix	295,260	6	3,677,985	2,718,425	24	12
Arkansas	Little Rock	137,754	27	2,362,239	2,286,419	33	17
California	Sacramento	411,049	3	29,839,250	23,668,562	1	73
Colorado	Denver	269,595	8	3,307,912	2,889,964	26	12
Connecticut	Hartford	12,977	48	3,295,669	3,107,576	27	254
Delaware	Dover	5,295	49	668,696	594,338	46	126
Florida	Tallahassee	151,939	22	13,003,362	9,746,421	4	86
Georgia	Atlanta	152,576	21	6,508,419	5,463,087	11	43

*1990 census: most recent census figures.
†1980 census figures.
‡Based on 1990 census.

mountains, the region has areas of deserts, plains, and plateaus. Although much of it is a thinly populated wilderness, some of its cities and towns are among the nation's fastest-growing areas. Denver ranks as the region's largest city by far.

Rich deposits of gold, silver, and other metals first attracted settlers to the region. Mining remains an important economic activity, but manufacturing is now the chief source of income. Cattle and other livestock graze on dry, grassy ranges, and farmers grow a variety of crops in the Rocky Mountain States Region. Many tourists visit the region to enjoy its scenic beauty and numerous ski resorts.

The population of the Rocky Mountain States Region includes people of European descent, as well as blacks, Mexican Americans, and American Indians. Mormons, whose ancestors founded a religious community in Utah in the 1800's, form an important cultural group in the region.

The Southwestern States Region spreads out over a vast area that is sometimes called the "wide open spaces." There, cattle graze on huge ranches, and vast fields of cotton and other crops soak up rays of blazing sunshine. However, petroleum has brought the region most of its wealth. The region has large deposits of petroleum and natural gas, as well as various other minerals. In the 1900's, refineries and petrochemical factories led the way to industrialization in the Southwest.

The industrialization has helped bring about much urban growth in the Southwestern States Region. The region includes many of the nation's fastest-growing cities. Its largest cities are, in order of size, Houston, Dallas, Phoenix, San Antonio, El Paso, and Austin. The region also has many retirement communities. Tourist attractions in the Southwest include huge, unspoiled areas of incredible natural beauty, such as the Grand Canyon and the Painted Desert.

Many cultures come together in the Southwest. The population includes people of various European backgrounds, and black, Mexican-American, and American Indian minority groups.

The Pacific Coast States Region, which borders the Pacific Ocean, is known for its dense forests, rugged mountains, and dramatic ocean shore. The scenic beauty and relatively mild climate of the region encourage an outdoor life style enjoyed by both residents and tourists.

Fertile valleys in the Pacific Coast States Region produce a large part of the nation's fruits, nuts, vegetables, and wine grapes. The region also has abundant timber, minerals, and fish. Much manufacturing takes place in its large cities, which include—in order of size—Los Angeles, San Diego, San Jose, San Francisco, and Seattle.

The discovery of gold and the opening of the Oregon Territory in the mid-1800's brought a stream of settlers to the Pacific Coast. New residents have continued to pour in ever since. Today, the population includes people of European ancestry, and black and Mexican-American minority groups. The Pacific Coast States Region also has more people of Asian ancestry than any other part of the United States, and a large number of American Indians.

Outlying areas. The United States has possession of various island territories in the Caribbean Sea and the Pacific Ocean. Some of them, such as Guam and the Virgin Islands, have a large degree of self-government. Puerto Rico, one of the areas, is a commonwealth associated with the United States that has been given wide powers of self-rule by the U.S. Congress. American Samoa, Guam, Puerto Rico, and the Virgin Islands each send to Congress a representative who votes only in committees.

See the table titled *Main outlying areas of the United States* in this article.

State abbreviation	State bird	State flower	State tree	Admitted to the Union	Order of admission	Members of Congress	
						Senate	House
Ala.	Yellowhammer	Camellia	Southern pine (Longleaf pine)	1819	22	2	7
§	Willow ptarmigan	Forget-me-not	Sitka spruce	1959	49	2	1
Ariz.	Cactus wren	Saguaro (Giant cactus)	Paloverde	1912	48	2	5
Ark.	Mockingbird	Apple blossom	Pine	1836	25	2	4
Calif.	California valley quail	Golden poppy	California redwood	1850	31	2	45
Colo.	Lark bunting	Rocky Mountain columbine	Blue spruce	1876	38	2	6
Conn.	Robin	Mountain laurel	White oak	1788	5	2	6
Del.	Blue hen chicken	Peach blossom	American holly	1787	1	2	1
Fla.	Mockingbird	Orange blossom	Cabbage (Sabal) palm	1845	27	2	19
Ga.	Brown thrasher	Cherokee rose	Live oak	1788	4	2	10

§The state has no traditional abbreviation.

Facts in brief about the states

State	Capital	Area (km²)	Rank in area	Population*	1980 Population†	Rank in pop.‡	Population density‡ (km²)
Hawaii	Honolulu	16,759	47	1,115,274	964,691	40	67
Idaho	Boise	216,432	13	1,011,986	944,038	42	5
Illinois	Springfield	145,934	24	11,466,682	11,427,414	6	79
Indiana	Indianapolis	93,720	38	5,564,228	5,490,260	14	59
Iowa	Des Moines	145,753	25	2,787,424	2,913,808	30	19
Kansas	Topeka	213,098	14	2,485,600	2,364,236	32	12
Kentucky	Frankfort	104,660	37	3,698,969	3,660,257	23	35
Louisiana	Baton Rouge	123,677	31	4,238,216	4,206,098	21	34
Maine	Augusta	86,156	39	1,233,223	1,125,030	38	14
Maryland	Annapolis	27,092	42	4,798,622	4,216,941	19	177
Massachusetts	Boston	21,456	45	6,029,051	5,737,081	13	281
Michigan	Lansing	151,586	23	9,328,784	9,262,070	8	62
Minnesota	St. Paul	218,601	12	4,387,029	4,075,970	20	20
Mississippi	Jackson	123,515	32	2,586,443	2,520,631	31	21
Missouri	Jefferson City	180,516	19	5,137,804	4,916,759	15	28
Montana	Helena	380,848	4	803,655	786,690	44	2
Nebraska	Lincoln	200,350	15	1,584,617	1,569,825	36	8
Nevada	Carson City	286,532	7	1,206,152	799,184	39	4
New Hampshire	Concord	24,032	44	1,113,915	920,610	41	46
New Jersey	Trenton	20,169	46	7,748,634	7,365,011	9	384
New Mexico	Santa Fe	314,925	5	1,521,779	1,303,445	37	5
New York	Albany	127,189	30	18,044,505	17,558,072	2	142
North Carolina	Raleigh	136,413	28	6,657,630	5,881,813	10	49
North Dakota	Bismarck	183,119	17	641,364	652,717	47	4
Ohio	Columbus	107,044	35	10,887,325	10,797,624	7	102
Oklahoma	Oklahoma City	181,186	18	3,157,604	3,025,495	28	17
Oregon	Salem	251,419	10	2,853,733	2,633,149	29	11
Pennsylvania	Harrisburg	117,348	33	11,924,710	11,864,751	5	102
Rhode Island	Providence	3,140	50	1,005,984	947,154	43	320
South Carolina	Columbia	80,582	40	3,505,707	3,122,814	25	44
South Dakota	Pierre	199,730	16	699,999	690,768	45	4
Tennessee	Nashville	109,152	34	4,896,641	4,591,120	17	45
Texas	Austin	691,030	2	17,059,805	14,227,574	3	25
Utah	Salt Lake City	219,889	11	1,727,784	1,461,037	35	8
Vermont	Montpelier	24,900	43	564,964	511,456	48	23
Virginia	Richmond	105,586	36	6,216,568	5,346,797	12	59
Washington	Olympia	176,479	20	4,887,941	4,132,204	18	28
West Virginia	Charleston	62,759	41	1,801,625	1,950,258	34	29
Wisconsin	Madison	145,436	26	4,906,745	4,705,642	16	34
Wyoming	Cheyenne	253,326	9	455,975	469,557	50	2

*1990 census: most recent census figures.
†1980 census figures.
‡Based on 1990 census.

State abbreviation	State bird	State flower	State tree	Admitted to the Union	Order of admission	Members of Congress	
						Senate	House
§	Nene (Hawaiian goose)	Hibiscus	Kukui	1959	50	2	2
Ida.	Mountain bluebird	Syringa (Mock orange)	Western white pine	1890	43	2	2
Ill.	Cardinal	Native violet	White oak	1818	21	2	22
Ind.	Cardinal	Peony	Tulip tree, or yellow poplar	1816	19	2	10
Ia.	Eastern goldfinch	Wild rose	Oak	1846	29	2	6
Kans. or Kan.	Western meadowlark	Sunflower	Cottonwood	1861	34	2	5
Ky. or Ken.	Kentucky cardinal	Goldenrod	Kentucky coffeetree	1792	15	2	7
La.	Brown pelican	Magnolia	Bald cypress	1812	18	2	8
Me.	Chickadee	White pine cone and tassel	White pine	1820	23	2	2
Md.	Baltimore oriole	Black-eyed Susan	White oak (Wye oak)	1788	7	2	8
Mass.	Chickadee	Mayflower	American elm	1788	6	2	11
Mich.	Robin	Apple blossom	White pine	1837	26	2	18
Minn.	Common loon	Pink and white lady's-slipper	Norway, or red, pine	1858	32	2	8
Miss.	Mockingbird	Magnolia	Magnolia	1817	20	2	5
Mo.	Bluebird	Hawthorn	Flowering dogwood	1821	24	2	9
Mont.	Western meadowlark	Bitterroot	Ponderosa pine	1889	41	2	2
Nebr. or Neb.	Western meadowlark	Goldenrod	Cottonwood	1867	37	2	3
Nev.	Mountain bluebird#	Sagebrush#	Single-leaf piñon	1864	36	2	2
N.H.	Purple finch	Purple lilac	White birch	1788	9	2	2
N.J.	Eastern goldfinch	Purple violet	Red oak	1787	3	2	14
N. Mex. or N.M.	Roadrunner	Yucca flower	Piñon, or nut pine	1912	47	2	3
N.Y.	Bluebird	Rose	Sugar maple	1788	11	2	34
N.C.	Cardinal	Flowering dogwood	Pine	1789	12	2	11
N. Dak. or N.D.	Western meadowlark	Wild prairie rose	American elm	1889	39	2	1
O.	Cardinal	Scarlet carnation	Buckeye	1803	17	2	21
Okla.	Scissor-tailed flycatcher	Mistletoe	Redbud	1907	46	2	6
Ore. or Oreg.	Western meadowlark	Oregon grape	Douglas fir	1859	33	2	5
Pa. or Penn.	Ruffed grouse	Mountain laurel	Hemlock	1787	2	2	23
R.I.	Rhode Island Red	Violet	Red maple	1790	13	2	2
S.C.	Carolina wren	Carolina jessamine	Palmetto	1788	8	2	6
S. Dak. or S.D.	Ring-necked pheasant	American pasqueflower	Black Hills spruce	1889	40	2	1
Tenn.	Mockingbird	Iris	Tulip poplar	1796	16	2	9
Tex.	Mockingbird	Bluebonnet	Pecan	1845	28	2	27
Ut.	Sea Gull	Sego lily	Blue spruce	1896	45	2	3
Vt.	Hermit thrush	Red clover	Sugar maple	1791	14	2	1
Va.	Cardinal	Dogwood	Dogwood	1788	10	2	10
Wash.	Willow goldfinch	Coast rhododendron	Western hemlock	1889	42	2	8
W. Va.	Cardinal	Rhododendron	Sugar maple	1863	35	2	4
Wis.	Robin	Wood violet	Sugar maple	1848	30	2	9
Wyo.	Meadowlark	Indian paintbrush	Cottonwood	1890	44	2	1

§The state has no traditional abbreviation.
#Unofficial

People

Population. The U.S. Census Bureau reported that in 1990 the country had a population of 249,632,692.

Whites make up about 80 per cent of the country's population. Blacks form the largest minority group. They account for about 12 per cent of the population. About 3 per cent of the population is of Asian descent. American Indians make up almost 1 per cent of the population. Other groups combine to make up the remaining 4 per cent.

The population of the United States includes many Hispanic people, such as people of Mexican, Puerto Rican, or Cuban descent. Hispanics consist mainly of whites, but they also include some blacks and American Indians. Hispanics make up 8 per cent of the U.S. population.

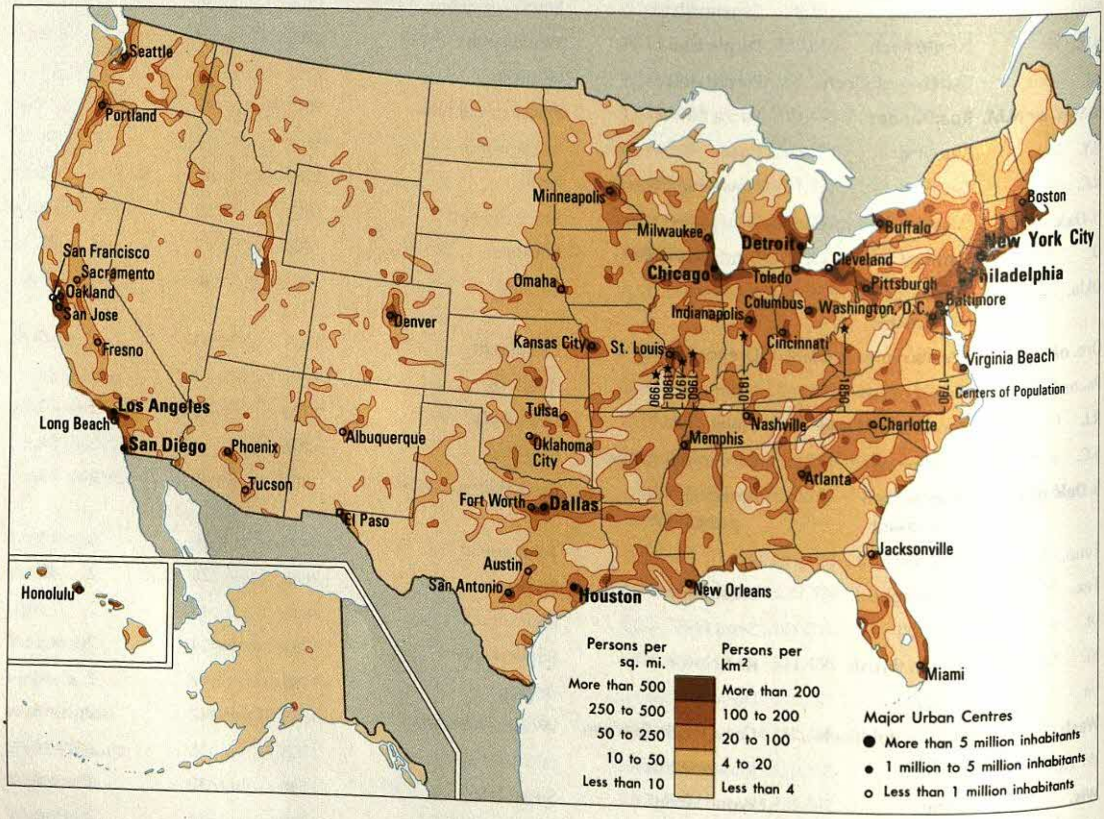
About 51.5 per cent of the people in the United States are females. The United States has one of the highest life expectancies of any country—74.9 years old. Since 1945, the part of the U.S. population that is over 65 years old has increased from 8 per cent to 12 per cent. Improvements in medical care have been the main reason for the increase. The over-65 population of the United States will continue to grow at a rapid rate as advances in medicine continue and as the large numbers of people born during the "baby boom" grow older. The baby boom was a period of high birth rate that occurred in the United States from 1946 to 1964.

Approximately 94 per cent of the total population was born in the United States. The largest foreign-born groups are, in order of size, Mexicans, Germans, Canadians, Italians, British, and Cubans. The United States has an overall average population density of about 27 people per square kilometre. But the density varies widely from place to place. See the map in this section of the article, which illustrates the density throughout the country.

Ancestry. The United States has one of the world's most varied populations in terms of ancestry. The population includes descendants of people from almost every part of the world.

The first people to live in what is now the United States were Indians, Eskimos, and Hawaiians. The Indians and Eskimos are descended from peoples who migrated to North America from Asia thousands of years ago. The ancestors of the Hawaiians were Polynesians who sailed to what is now Hawaii from other Pacific islands about 2,000 years ago.

Most white Americans trace their ancestry to Europe. Some Spaniards settled in what is now the United States during the 1500's. European settlement increased



Population density and centres of population

This map shows the population density throughout the United States. Population density is the average number of persons who live on each square mile or square kilometre in an area. The map also shows how the country's centre of population moved westward between 1790 and 1990.

Most Hispanic Americans are of Mexican descent. The Mexican Americans shown above are celebrating Cinco de Mayo (May 5), a Mexican national holiday.

Asians are a major immigrant group in the United States. The street shown above is in a Korean neighbourhood in Flushing, New York.

sharply during the 1600's. At first, most of the settlers came from England. But America soon attracted many emigrants from other nations of northern and western Europe including France, Germany, Ireland, the Netherlands, and Scotland; and the Scandinavian lands of Denmark, Norway, and Sweden. Until the late 1800's, northern and western Europe provided most of the emigrants. Then, large waves of people began arriving from southern and eastern European nations, including Austria-Hungary, Greece, Italy, Poland, and Russia.

Most Hispanic Americans are people who immigrated—or whose ancestors immigrated—to the United States from Latin America. A small percentage of them trace their ancestry directly back to Spain. Some have mainly Spanish ancestry. Others have mixed Spanish and Latin-American Indian or black ancestry.

Most black Americans are descendants of Africans who were brought to the United States as slaves during the 1600's, 1700's, and 1800's and forced to work on plantations. See **Slavery** (Slavery in the United States).

Since the 1800's, the United States has attracted immigrants from Asia. Most Asian Americans trace their ancestry to China, India, Indochina, Japan, Korea, or the Philippines. For more details on the flow of people into the United States through the years, see **Immigration.**

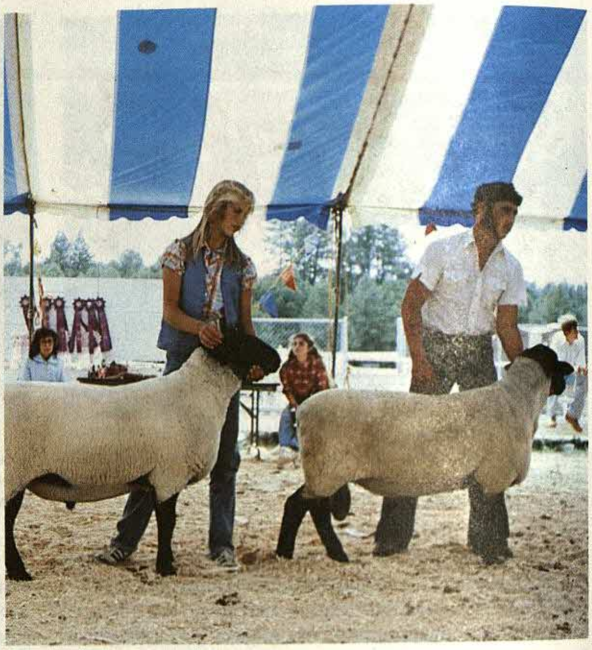
The United States has often been called a *melting pot.* This term refers to the idea that the country is a place where people from many lands have come together and formed a unified culture. Americans have many things in common. For example, the vast majority of them speak English, and people throughout the country dress similarly and eat many of the same kinds of foods. Public education, mass communication, and other influences have helped shape a common identity. But in other ways, U.S. society is an example of *cultural pluralism.* That is, large numbers of its people have retained features of the cultures of their ancestors. Many Americans take special pride in their origins. They preserve traditions—and in some cases the languages—of their ancestors. In many cities, people of different national or ethnic origins live in separate neighbourhoods, and shops and restaurants reflect their cultural heritages. Ethnic festivals, parades, and other events emphasize the nation's cultural pluralism.

Language. The United States has never had an official language, but English has always been the chief language spoken in the country. Emigrants from the British Isles—who included the nation's founders—spoke English. Many emigrants from other lands who spoke little or no English also came to the United States. They learned at least enough English to be able to communicate with other Americans. Their children learned English in school. The immigrants' children generally spoke both English and their ethnic language, and the immigrants' grandchildren often spoke only English.

Today, Spanish is the second most common language in the United States. The region that is now the Southwestern United States was colonized by Spain in the 1500's. As a result, many people from that region speak Spanish. Since the 1950's, many Spanish-speaking people have immigrated to the United States from Mexico, Cuba, and other places. Many of these people learned to speak English. But others speak only Spanish. This is especially true in Spanish-speaking neighbourhoods that developed in cities. Some people feel that special efforts should be made to provide education and other services in Spanish for Americans who speak only Spanish.

Many people believe every American should know English. They point out that it is difficult to get a job outside Spanish-speaking neighbourhoods without a knowledge of the English language. They also argue that a language shared by everyone is an important unifying force for a country. In the 1980's, several states passed laws declaring English to be their only official language. These laws provide that the state government must offer its services in English, and need not do so in any other language. But in some places, public documents and signs in public places are written in both English and Spanish.

Way of life



Urban and rural life in the United States contrast sharply. Motor vehicles move slowly along a street lined by big buildings in central San Antonio, *above left.* At a county fair, *right,* farm people show their sheep in a livestock competition.

For census purposes, the United States is divided into *urban areas* and *rural areas.* An urban area, as defined by the U.S. Census Bureau, is a community with 2,500 or more people. A rural area is a community with fewer than 2,500 people.

In 1790, the year of the first census, about 95 per cent of the nation's people lived in rural areas, and only about 5 per cent were urban dwellers. Through the years, these percentages changed steadily and dramatically. Today, about 74 per cent of all the people live in urban areas. Only about 26 per cent live in rural areas.

Several factors contributed to the dramatic population shift from the countryside to urban areas. Through the years, Americans greatly improved agricultural methods and equipment. From the 1800's onward, farm work has become more and more efficient, farm production has soared, and fewer and fewer people have been needed to work on the nation's farms. At the same time, an industrial boom has created large numbers of new jobs in the nation's urban areas. As a result of these economic changes, a steady flow of people from rural to urban areas has taken place. Also, large numbers of immigrants—many of whom had been farmers in their homelands—found jobs in cities and settled there when they reached the United States. In addition, the variety of job choices and recreational, educational, and cultural opportunities in cities attracted many rural people, especially the young. Large numbers of rural people left home to seek employment and excitement in cities.

Urban life. Urban areas, which range from giant cities surrounded by suburbs to small towns, dot the U.S. landscape. Although the urban areas cover about 2 per cent of the land, they are the home of about three-quarters of the people. New York City, with about $7\frac{1}{4}$ million people, is the largest U.S. city by far. Los Angeles has about $3\frac{1}{2}$ million people. Chicago has a population of about $2\frac{3}{4}$ million. Five other U.S. cities—Houston, Philadelphia, San Diego, Detroit, and Dallas—each have more than 1 million people.

Networks of suburbs surround many U.S. cities. The central cities and their suburbs form units called metropolitan areas. There are 268 metropolitan areas in the United States. The three largest are, in order of size, the New York-Newark, Los Angeles-Long Beach, and Chicago areas. The New York-Newark metropolitan area has about 17 million people, the Los Angeles-Long Beach area has more than $8\frac{3}{4}$ million people, and the Chicago area has about $7\frac{1}{2}$ million people.

For many years, most of the country's urban population lived in the central cities. During the mid-1900's, suburban population soared while central city growth slowed or decreased. In 1980, more Americans lived in suburbs than in central cities.

The Northeast and Midwest have long had most of the nation's largest urban areas. But during the 1900's, other parts of the country have experienced dramatic urban growth. Since the early 1900's, many California urban communities—especially Los Angeles—have grown tremendously. Since the mid-1900's, the populations of many more urban areas in the West, and in the South and Southwest, have soared. Such metropolitan areas as Atlanta, Dallas, Denver, Houston, and Phoenix grew rapidly. Large numbers of people were attracted to the West, South, and Southwest by jobs created by new industries. Also, many of the fastest-growing communities have warm, sunny climates, which helped attract many of the newcomers. Parts of the South, Southwest, and West are sometimes called the *Sun Belt* because they have such climates.

Urban economies provide jobs for a great variety of workers, including office and factory workers, bankers, doctors, fire fighters, medical personnel, police officers, teachers, trash collectors, and construction and transportation workers. Urban life also has many other positive features. Because of their large populations, urban areas generally offer a wide variety of specialized services and shops. Urban dwellers can take advantage of an assortment of restaurants, recreation facilities, and places of entertainment. Because of such facilities as art galleries, museums, libraries, theatres, and concert halls, many cities are important cultural centres. These and other features make urban areas exciting and interesting places to live for many people.

The people of most U.S. urban areas represent a variety of ethnic backgrounds. Most cities include neighbourhoods in which almost all the people belong to the same ethnic or nationality group. The people of large urban areas are also divided economically. Urban society includes extremely wealthy and extremely poor people, and a huge middle class. The wealthy live in luxurious flats or *condominiums* (apartment buildings), or in large, comfortable single-family houses. Middle-class housing also includes flats, condominiums, and single-family houses. In general, the housing of the middle class is comfortable, though not as luxurious as that of the wealthy. In contrast, large numbers of urban poor people live in substandard housing. They rent crowded, small flats or run-down single-family houses.

In addition to substandard housing, urban areas have a number of other negative features. Such features include high crime rates, racial and ethnic friction, noisy surroundings, pollution, and traffic jams. See **City** (City problems).

Rural life. More than 98 per cent of all the land of the United States is classified as rural. But much of the rural land is uninhabited or only lightly inhabited. About a fourth of all Americans live in areas that are classified as rural.

Farms provide the economic basis of the nation's rural areas. But only about 5 per cent of the country's rural people work on farms. Many other rural people own or work in businesses related to agriculture, such as grain and feed stores and warehouses. Mining and related activities and light industries also employ many rural people. Still other rural Americans work as teachers, police officers, salesclerks, or in other occupations. Many farmers hold other jobs for part of the year to add to their incomes.

American farmers of today lead vastly different lives from those of their grandparents. Machines have eliminated much backbreaking farm work. Farmers use machines to help them plough, plant seeds, harvest crops, and deliver their products to market. Many farms have conveyor systems so that the farmer no longer has to shovel feed to farm animals. Milking machines make morning and evening chores easier. In the home, farm families may have all the comforts and conveniences of people who live in cities. During the 1900's, the car, telephone, radio, and television have brought American farm families into close contact with the rest of the world.

The steady decline in the percentage of the country's

Sprawling suburbs surround many American cities. Rows of comfortable houses line the streets of most of them. Highways connect the suburbs with their central cities, where large numbers of suburban dwellers work.

rural population has slowed since 1970. Although many people continued to move away from rural areas, others chose to move into rural towns and farm communities. Many of the newcomers wanted to escape the overcrowding, pollution, crime, and other problems that are part of life in urban areas and to take advantage of benefits of country living. Rural areas have lower crime rates and less pollution than urban areas. They are also far less noisy and crowded.

Because of their small populations, rural communities collect less tax revenues than urban communities do, and they generally cannot provide the variety of services that urban areas can. For example, rural communities have cultural and recreational facilities that are more limited than those available in urban areas. For many rural Americans, social life centres around family gatherings, church and school activities, special interest clubs, and such events as state and county fairs.

Rural areas generally have less diversified economies than urban areas. Because there are fewer and a smaller variety of jobs to choose from, rural communities may experience more widespread economic hardships than urban communities. A single economic downturn—a drop in farm prices, for example, or the closing of a mine—can cause economic hardship for an entire rural area.

The nation's rural areas, like its urban areas, have wealthy, middle class, and poor people. For the most part, however, the gaps between economic classes are not as large in rural areas as in urban areas. Most rural Americans live in single-family houses. The majority of the houses are comfortable and in good condition. But some people, including many who live in parts of Appalachia—in the eastern United States—and other pockets of rural poverty, have run-down houses and enjoy few luxuries.

See **Ranching.**

Education has been an important factor in the economic development of the United States and in the achievement of a high standard of living for most Americans. It has also contributed to the enjoyment of life for many people. Americans are among the best-educated people in the world. Schools, libraries, museums, and other educational institutions in the country provide learning opportunities for people of all ages.

Schools. During the early history of the United States, most schools were privately owned. Church groups owned and operated many of them. In the early 1800's, the idea of free state schools began to gain widespread support in the country. State and local governments took the responsibility for establishing state school systems. By 1918, every state had laws requiring children to attend school until they reached a certain age or completed a certain year. Today, about 80 per cent of the nation's primary and secondary schools, and about 45 per cent of its institutions of higher learning, are state schools. The rest are private schools run by religious organizations or private groups.

The United States has about 74,000 primary schools, about 25,000 secondary schools, and about 6,800 combined primary and secondary schools. In addition, there are approximately 3,300 colleges and universities.

Central cities of most U.S. urban areas have neighbourhoods where most people belong to the same racial or ethnic group. In New York City's Harlem area, *above left,* most people are blacks. A Chicago neighbourhood, *right,* has many Spanish-speaking people and some signs in Spanish.

The educational system of the United States includes many learning opportunities outside formal classrooms. An adult education class, *above left,* offers woodworking lessons. At a museum, *right,* people study exhibits dealing with space travel.

Many American children begin their schooling before enrolling in primary school. About 30 per cent of all the children aged 3 and 4 attend nursery schools, and about 95 per cent of all 5-year-olds attend kindergarten. More than 99 per cent of all U.S. children complete primary school, and about 75 per cent of them graduate from secondary school. Approximately 65 per cent of the secondary school graduates go on to colleges or universities. About 20 per cent of the country's people complete at least four years of higher education.

Adult education is an important part of the school system in the United States. Millions of adults take courses at universities, colleges, vocational schools, recreation centres, or other institutions. Many adults continue their schooling to improve their job skills or to get training for a new job. Others attend classes simply to develop new hobbies or to find out more about topics that interest them. A growing number of part-time and full-time college and university students are men and women who have held jobs or raised families and are returning to higher education to get a degree.

State schools in the United States are supported mainly by taxation. Private schools get their operating funds chiefly from tuition fees and contributions from private citizens. The nation's schools, like its private businesses, have always had to deal with financial problems. Rapidly rising material and salary costs have increased the financial problems of the schools. Some state and private schools have cut back on programmes and reduced their faculties to try to keep expenses in line with revenues. Colleges and universities have sharply increased their tuition and other fee charges.

Schools in the United States face a number of other problems. Many schools, particularly in large cities, have run-down buildings, inadequate supplies, and overcrowded conditions. A far higher percentage of young people in these areas fail to complete secondary school than in other areas. Some people claim that schools in their areas fail to provide students with the basic skills necessary to obtain and hold jobs. Schools with large numbers of students from foreign countries face the problem of educating some children who cannot speak English. Demands for bilingual education increased in the 1970's, especially in school districts with large numbers of Spanish-speaking students. Bilingual education involves instruction in both English and the native language of the students. Also in the 1970's, a decline in the nation's birth rate caused a reduction in the number of children of school age. Some schools closed or reduced their staffs because of the declining enrolment. As a result of these reductions, many teachers lost their jobs.

Libraries provide the American people with access to books, periodicals, pamphlets, and other printed matter. In addition, many libraries offer audio-visual materials, research services, lectures, and educational exhibits.

There are about 8,800 public libraries in the United States. They range from one-room libraries in small towns to huge city libraries and their branches. There are about 5,000 university and college libraries in the United States, as well as thousands of libraries in primary schools and secondary schools.

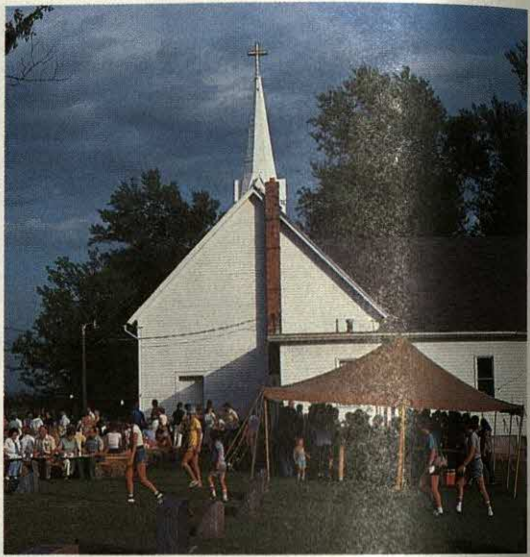
The nation's library system also includes large numbers of private research libraries and special libraries with collections limited to certain fields of knowledge. In addition, many government agencies and businesses operate their own libraries. Three of the government's many libraries are considered national libraries because of their large and varied collections and because of the many services they provide. They are the Library of Congress, the National Agricultural Library of the Department of Agriculture, and the National Library of Medicine of the Department of Health and Human Services. These three libraries are all situated in or near Washington, D.C.

Museums. There are about 6,100 museums in the United States. They include museums of art, history, natural history, and science. In addition, a number of historic houses and villages are classed as museums. The collections of many of the nation's museums are devoted to a single topic of interest, such as the history of baseball or railways. Some museums have huge collections of items from many parts of the world. Others feature exhibits of local interest. In addition to exhibits, many U.S. museums offer classes, lectures, films, field trips, and other educational services. The most famous museums in the United States include the Metropolitan Museum of Art in New York City, the Museum of Science and Industry in Chicago, and the Smithsonian Institution in Washington, D.C.

Religion. About 60 per cent of all the American people are members of an organized religious group. Among them, about 52 per cent are Protestants, 37 per cent Roman Catholics, 4 per cent Jews, 3 per cent Mormons, and 3 per cent are members of Eastern Orthodox Churches. Relatively small numbers of Americans belong to other faiths, such as Islam and Buddhism. Roman Catholics make up the largest single religious denomination in the United States. About 53 million Americans are Roman Catholics. The country's largest Protestant groups are, in order of size, Baptists, Methodists, Lutherans, Pentecostals, and Presbyterians.

Religion has played an important role in the history of the United States. Many people came to the American Colonies to escape religious persecution in other lands. The early colonists included Puritans in New England, Roman Catholics in Maryland, and Quakers in Pennsylvania. The early Americans made religious freedom one of the country's basic laws. The First Amendment to the Constitution of the United States, which was adopted in 1791, guarantees every American freedom of religion. It also provides that no religious group be given official recognition as a state church. These provisions were intended to prevent persecution of religious minorities and the favouring of one church over another. The country's religious freedom was one of the reasons immigrants continued to flock to the United States through the years.

Although all religious groups in the United States enjoy freedom, Christian traditions have had a stronger influence on American life than those of any other faith. For example, most offices, factories, and other places of employment are closed on Sunday, the Sabbath of most Christians. The influence of Christianity results from the fact that a majority of the people are Christians.



Religion plays an important role in the lives of millions of Americans. The country's churches provide people with moral guidance and places for worship. Many churches also serve as centres for social gatherings, such as a church picnic, *above.*

Throughout the country's history, religion has influenced everyday life in a number of ways. For example, in colonial America many religious rules were enforced by local governments. Some of the laws that prohibited activities on Sunday still exist.

Today, religion has relatively less influence in the everyday lives of most Americans. But churches and other religious organizations continue to play important roles in American life. Their chief functions are to provide moral guidance and places for worship. However, religious groups also operate many primary and secondary schools, colleges, universities, hospitals, and nursing homes. They provide aid for refugees, the poor, the elderly, orphans, and other persons in need. Social gatherings are held at many churches. Some religious groups take active roles in discussing such issues as birth control and rights for minorities and women.

Recreation. Most Americans have a great deal of leisure time, and they spend it in a variety of ways. They pursue hobbies; take part in sports activities; attend sporting and cultural events; watch movies and television; listen to records, tapes, and radios; and read books and magazines. They enjoy trips to museums, beaches, parks, playgrounds, and zoos. They go away for weekends and holidays, eat at restaurants, go on picnics, and entertain friends at home. These and other activities contribute to the richness and diversity of American life.

Sports rank as a leading American pastime. Millions of Americans enjoy watching such sports events as motor car races, horse races, and baseball, basketball, and American football games—either in person or on television. Many Americans, especially children and other young people, play baseball, basketball, American football, and soccer. People of most ages participate in

Recreational activities provide the people of the United States with leisure-time enjoyment. Fans thrill to the excitement of the duel between a pitcher and batter in a baseball game, *above left.* A large group of runners compete—and get exercise—in a marathon race, *right.*

such sports as bicycle riding, boating, bowling, fishing, golf, hiking, hunting, running, skiing, softball, swimming, and tennis.

Films, plays, concerts, operas, and dance performances attract large audiences in the United States. Americans find entertainment at home, as well. About 98 per cent of all American homes have a television set. On average, a set is in use in each home for about six hours a day.

Hobbies occupy much of the leisure time of many Americans. Large numbers of people enjoy raising flower or vegetable gardens or indoor plants. Other popular hobbies include stamp collecting, coin collecting, and photography. Since the mid-1900's, interest in such crafts hobbies as needlepoint, quilting, weaving, pottery making, and woodworking has increased sharply.

Most Americans spend part of their leisure time travelling. Many take annual holidays, as well as occasional one-day excursions or weekend trips. Some people have holiday homes near lakes or seashores, in the mountains, or in other recreation areas. Others own motor homes or caravans, which provide comfortable living and sleeping quarters during trips. Some people enjoy camping in tents. Others prefer to stay in hotels or motels while on trips.

Food. Americans eat a wide variety of foods. A typical dinner consists of meat and potatoes, plus a lettuce salad or a vegetable, and sometimes rolls or bread. Favourite dinner meats include beef steaks, ground beef dishes, chicken, ham, and turkey. Fish, shellfish, and such dishes as pizza and spaghetti also serve as main courses.

For lunch, many Americans eat a hamburger or a hot dog, or a sandwich made with meat or sliced sausage, cheese, peanut butter, chicken salad, or tuna salad.

Some Americans enjoy a hearty breakfast of eggs or pancakes served with bacon or sausage. Others prefer a light breakfast of toast or a pastry, or cereal with milk and fruit. Orange juice accompanies many breakfasts.

Cake, biscuits, pie, and ice cream are eaten as desserts and snacks. Other snack foods include chocolate and sweets, crisps made from potatoes or maize, and fruits such as bananas, apples, oranges, and grapes.

Beverages are drunk with meals and also at other times for refreshment. Consumption of soft drinks, especially cola, exceeds that of any other beverage. Americans also drink much coffee, milk, and beer, and smaller amounts of fruit juices, tea, and wine.

Americans eat out often. *Fast-food* restaurants have wide popularity. They offer a limited variety of foods, all of which are served within a few minutes. Common fast-food items include hamburgers and other sandwiches, fried chicken, and chips. Many Americans also enjoy the cooking of other countries. Chinese, French, Italian, and Mexican restaurants have long been popular. In recent years, Americans have begun to enjoy the cuisines of India, Japan, the Middle East, and many other areas.

Some regions of the United States—for example, Hawaii and Louisiana—have distinctive food specialities.

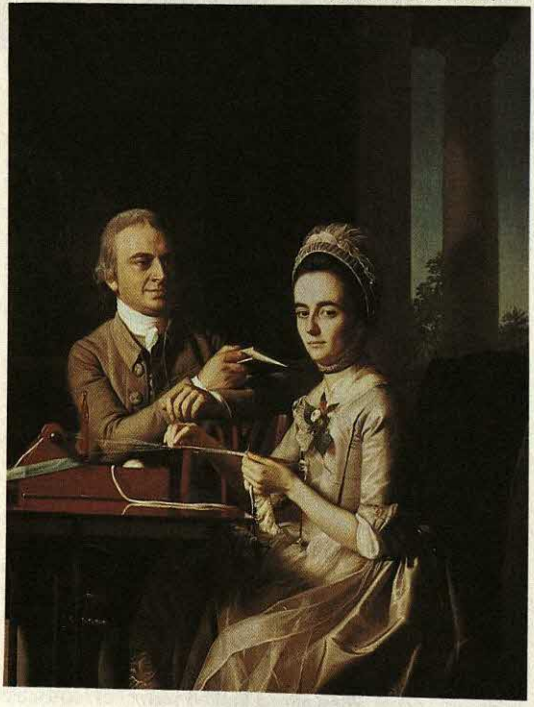
Arts

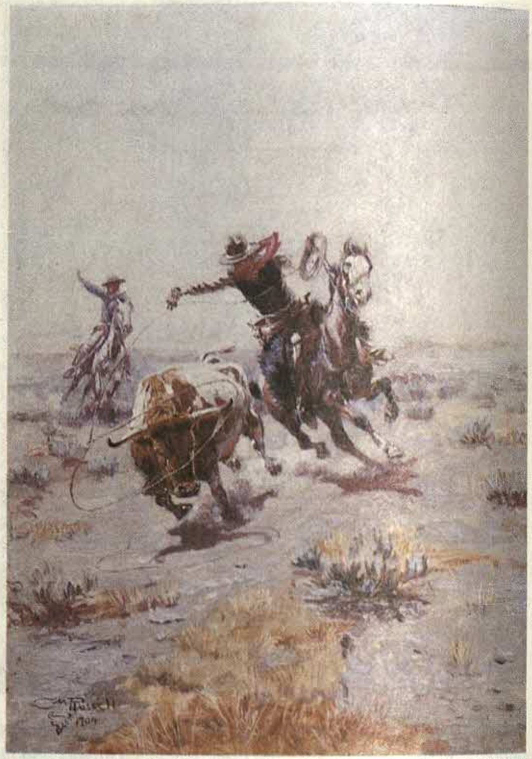
European colonists arrived in America during the early 1600's, bringing European art traditions with them. But within a few years, colonists were building houses that probably rank as the first major American works of art. During the 1700's, American craftworkers began to produce outstanding examples of furniture, sculpture, and silverwork. By the mid-1700's, colonial painters were creating excellent portraits.

The first important American literature appeared in the early 1800's with the works of such authors as Washington Irving and James Fenimore Cooper. During the late 1800's, American architects began designing skyscrapers that revolutionized urban architecture throughout the world. Two uniquely American art forms, jazz and musical comedy, developed during the late 1800's and early 1900's. In the early 1900's, the United States gained international leadership in the new art forms of films and modern dancing.

Today, American architects, authors, composers, painters, and sculptors have achieved worldwide recognition and influence. Many of them have shown a keen interest in developing new styles, new ways of expressing themselves, and even new forms of art.

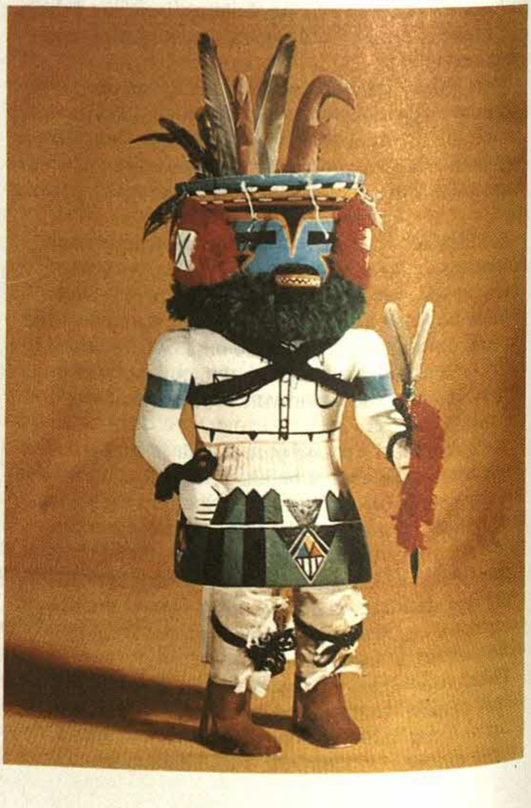
Oil painting on canvas (1773); the Historical Society of Pennsylvania



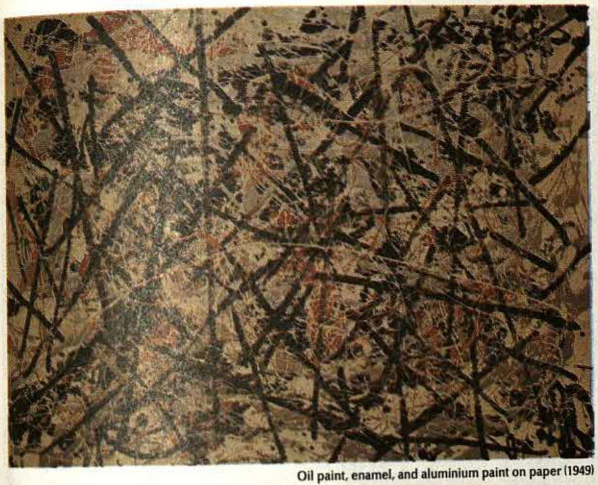


Oil painting on canvas (1904); Woolaroc Museum, Bartlesville, Oklahoma

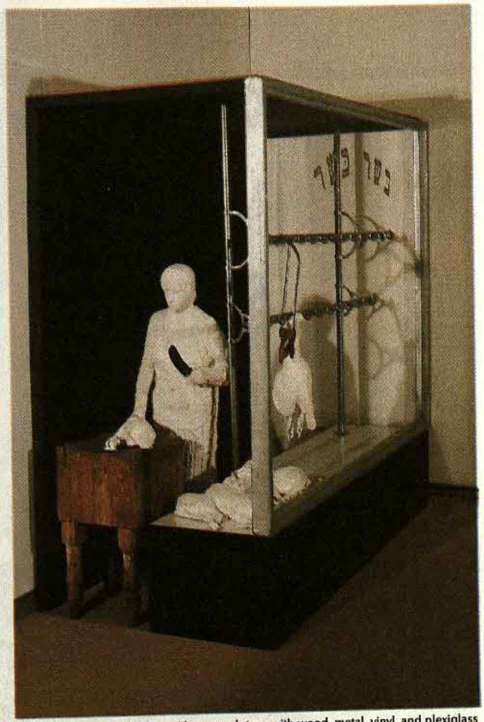
Museum of the American Indian, New York City



Early painting and sculpture emphasized American themes. Most colonial painters concentrated on portraits. John Singleton Copley painted a famous portrait of soldier and politician Thomas Mifflin and his wife, *above.* The portrait shows Copley's ability to capture the human character of colonial leaders. In the 1800's and early 1900's, many painters turned to the West for subjects. *The Bolter* by Charles Marion Russell, *upper right,* is typical of this artist's scenes of cowboy life. For generations, the Hopi Indians of Arizona have carved wooden figures called Kachina dolls, *right,* for use in religious ceremonies.



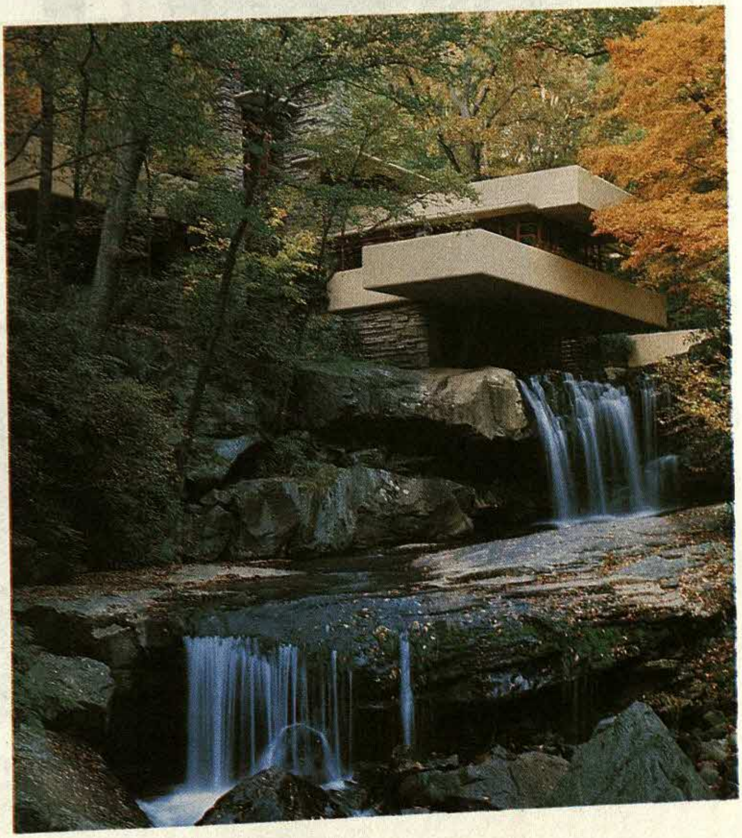
Oil paint, enamel, and aluminium paint on paper (1949)



Plaster sculpture with wood, metal, vinyl, and plexiglass (1965); Art Gallery of Ontario, Canada

Modern painting and sculpture have produced both abstract and realistic styles. Jackson Pollock gained fame for such paintings as *Number 13, 1949,* shown above. These paintings consist of rhythmic patterns dribbled onto the painting surface. George Segal placed plaster figures among actual objects, as in *The Butcher Shop,* shown on the right.

Architecture in the United States developed the skyscraper as one of the most characteristic types of modern building. The Sears Tower, *lower left,* dominates the Chicago skyline. Frank Lloyd Wright ranks as America's most important architect. Wright's Fallingwater house, *lower right,* shows his ability to blend a structure with its natural setting.



King Oliver's Creole Jazz Band

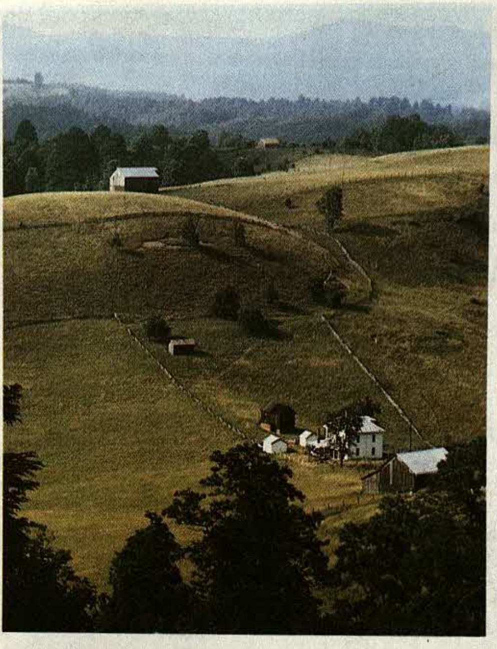
Minnie Pearl and Roy Acuff performing at the Grand Ole Opry

Popular music has taken many forms in the United States. Jazz relies on spontaneous playing. Trumpeter Louis Armstrong, standing in the centre of the group shown on the upper left, was the first great jazz soloist. Country music, *left,* began as the folk music of Southern whites but soon gained widespread acceptance. Singer Elvis Presley, *above,* helped make rock music the leading type of popular music in the mid- and late 1900's.

Films have become one of the most popular and influential art forms in the United States since the early 1900's. The animated films of Walt Disney, such as *Snow White and the Seven Dwarfs, left,* have charmed cinema audiences throughout the world. Steven Spielberg became a leading director with the success of *E.T., right,* and other science fiction and adventure films.

Dancing in the United States often explores American subjects. The famous dancer and dance composer Martha Graham created *Appalachian Spring,* shown above, a ballet that celebrates the courage and dignity of American pioneers during the early 1800's.

Theatre has produced many masterpieces of serious drama and musical comedy. Arthur Miller's drama *Death of a Salesman,* shown on the left, deals with a salesman whose search for success brings him only disappointment and failure. Frank Loesser wrote the music and words for *Guys and Dolls,* shown on the right, a musical about colourful characters who live in New York City.



Rolling hills dotted with farm buildings stretch across the Appalachian Highlands, which extend from Maine to Alabama. The scene shown above is in West Virginia.

A swamp that includes bald cypress trees lies in Florida's Everglades National Park in the southernmost part of the Coastal Lowlands. The Coastal Lowlands extend from New England to Texas.

The United States has an area of 9,372,571 square kilometres. The country, excluding Alaska and Hawaii, can be divided into seven major land regions. The regions are: (1) the Appalachian Highlands; (2) the Coastal Lowlands; (3) the Interior Plains; (4) the Ozark-Ouachita Highlands; (5) the Rocky Mountains; (6) the Western Plateaus, Basins, and Ranges; and (7) the Pacific Ranges and Lowlands. For a discussion of the land regions of Alaska and the islands of Hawaii, see the articles on those states.

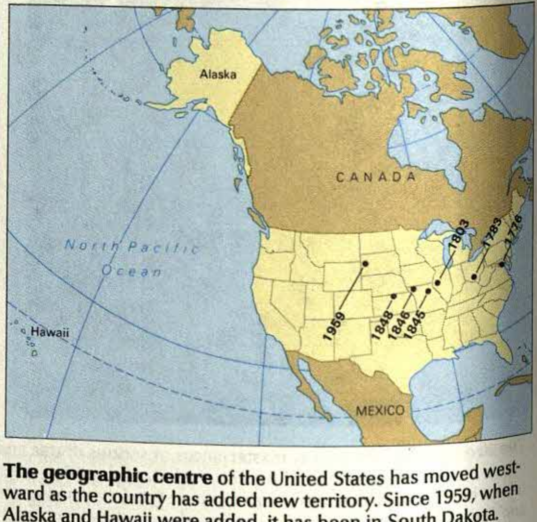
The Appalachian Highlands extend from the northern tip of Maine southwestward to Alabama. This rugged region has many mountain ranges.

The White Mountains and the Green Mountains of northern New England are old mountains, worn down but craggy in some places. Southern New England consists mostly of hilly land. New England's chief river is the Connecticut. The Adirondack Upland of northern New York includes mountains and many beautiful lakes.

From central New York southward, the Appalachian Highlands has three main subdivisions. They are, from east to west: the Blue Ridge Mountains Area, the Ridge and Valley Region, and the Appalachian Plateau.

The Blue Ridge Mountains Area consists of some of the oldest mountains in the country. The Blue Ridge Mountains themselves are a narrow chain that stretches from southeastern Pennsylvania to northeastern Georgia. The Great Smoky Mountains of Tennessee and North Carolina are also part of this area. The Hudson Highlands of New York and New Jersey form a northern extension of the area. Several mighty rivers, including the Delaware, Hudson, Potomac, and Susquehanna, cut through the mountains to form *water gaps*. These water gaps provide low, level land suitable for the construction of major roads and railways.

The Ridge and Valley Region consists of the Great Valley in the east and a series of alternating ridges and valleys in the west. The rolling Great Valley is actually a series of valleys, including the Cumberland, Lebanon, and Lehigh valleys in Pennsylvania; the Shenandoah Valley in Virginia; the Valley of East Tennessee; the Rome Valley in Georgia; and the Great Valley of Alabama. The region has some forests, but other wooded areas have



The geographic centre of the United States has moved westward as the country has added new territory. Since 1959, when Alaska and Hawaii were added, it has been in South Dakota.

been cleared to take advantage of fertile soil and relatively level land for farming. About 50 dams on the Tennessee River and its branches in the southern Great Valley provide flood control and hydroelectric power.

The Appalachian Plateau extends from New York to Alabama. Glaciers covered the northern plateau during the Ice Age and carved out natural features, including the Finger Lakes in New York. Deep, narrow river valleys cut through the plateau in some areas, creating steep, rugged terrain. Deposits of coal, iron ore, oil, and other minerals lie beneath the surface, and many people in the region work in mining. Parts of the region have good farmland. But thin, rocky soil covers much of the plateau, and the steep hillsides are badly eroded.

The Coastal Lowlands extend from southeastern Maine, across the eastern and southern United States, to eastern Texas. Forests of hickory, oak, pine, and other trees are common throughout the lowlands. The region has three subdivisions: (1) the Piedmont, (2) the Atlantic Coastal Plain, and (3) the Gulf Coastal Plain.

The Piedmont is a slightly elevated rolling plain that separates the Blue Ridge Mountains from the Atlantic Coastal Plain. It stretches from southern New York to Alabama. The eastern boundary of the Piedmont is called the *Fall Line.* Rivers that reach the Fall Line tumble down from the Piedmont to the lower coastal plains in a series of falls and rapids. In the early days of settlement of the eastern United States, boats travelling inland on coastal rivers stopped at the Fall Line and unloaded their cargoes. The rapids prevented the boats from travelling farther. They also provided water power for early industries. As a result, many cities grew up along the Fall Line. Tobacco is a leading agricultural product of the Piedmont, and the region also has many orchards and dairy farms.

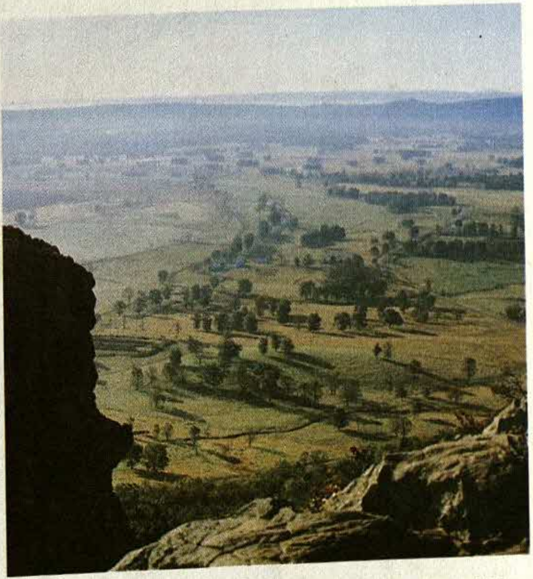
The Atlantic Coastal Plain extends eastward from the Piedmont to the Atlantic Ocean. It ranges from a narrow strip of land in New England to a broad belt that covers much of North and South Carolina, Georgia, and Florida. In colonial times, the broad southern part of the plain encouraged the development of huge plantations for growing cotton. Cotton is still grown there. Other farm products include vegetables, citrus fruits, peanuts, and tobacco. In New England, where the plain narrows to a width of about 15 kilometres in some places, crop farming has always been less important. Many New Englanders turned to manufacturing, fishing, or shipping instead of farming.

Numerous rivers cross the plain and flow into the Atlantic Ocean. They include the Delaware, Hudson, James, Potomac, Roanoke, Savannah, and Susquehanna. Bays cut deeply into the plain in some areas, creating excellent natural harbours. They include Cape Cod Bay, Boston Bay, Chesapeake Bay, Delaware Bay, and Long Island Sound.

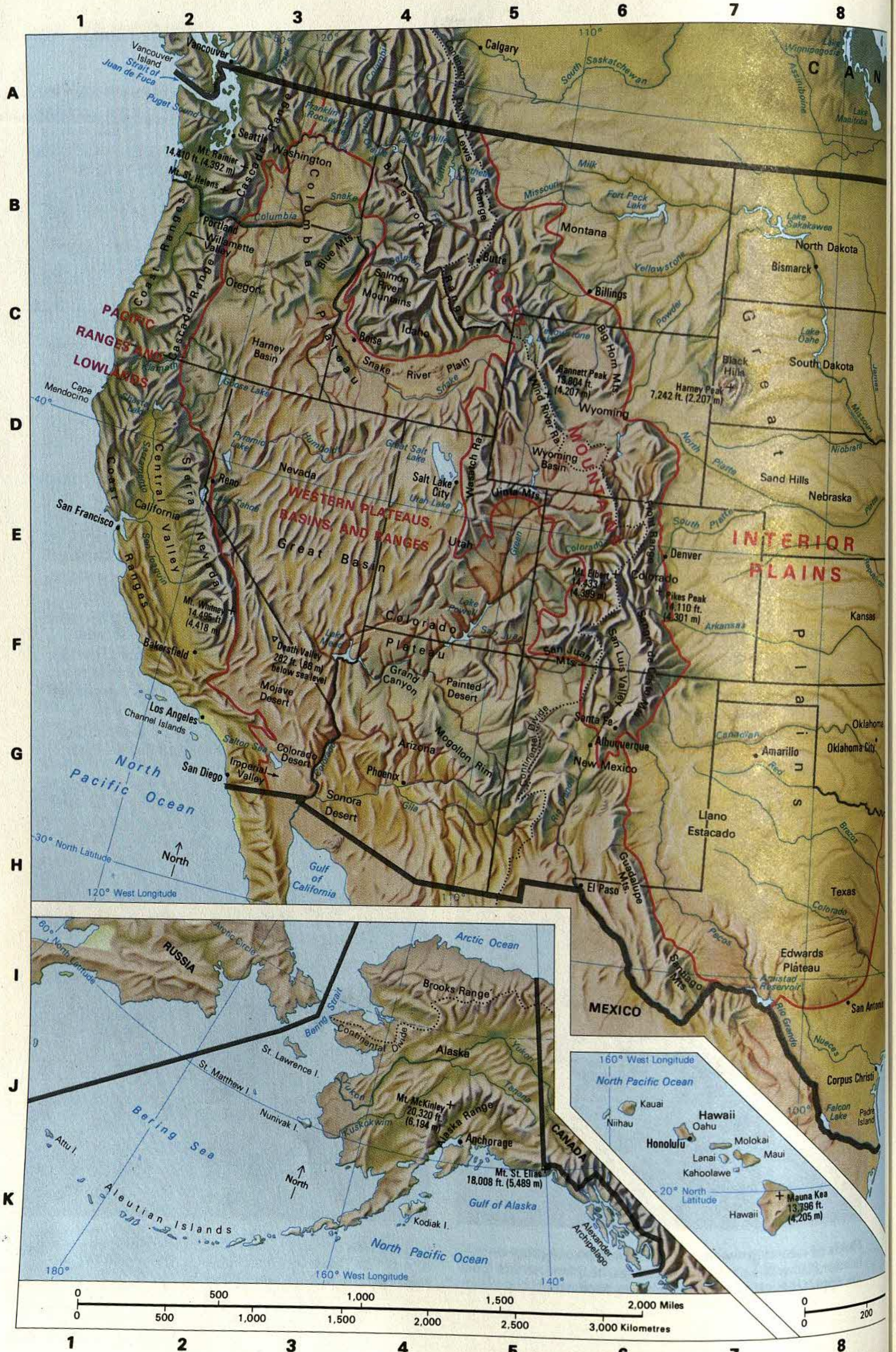
Many resort areas flourish around the beautiful sandy beaches and offshore islands that line much of the Atlantic shore from New England to Florida. In some inland regions, swamps form large wilderness areas, where trees and grasses rise up from shallow waters and tangled vines and roots form masses of vegetation.

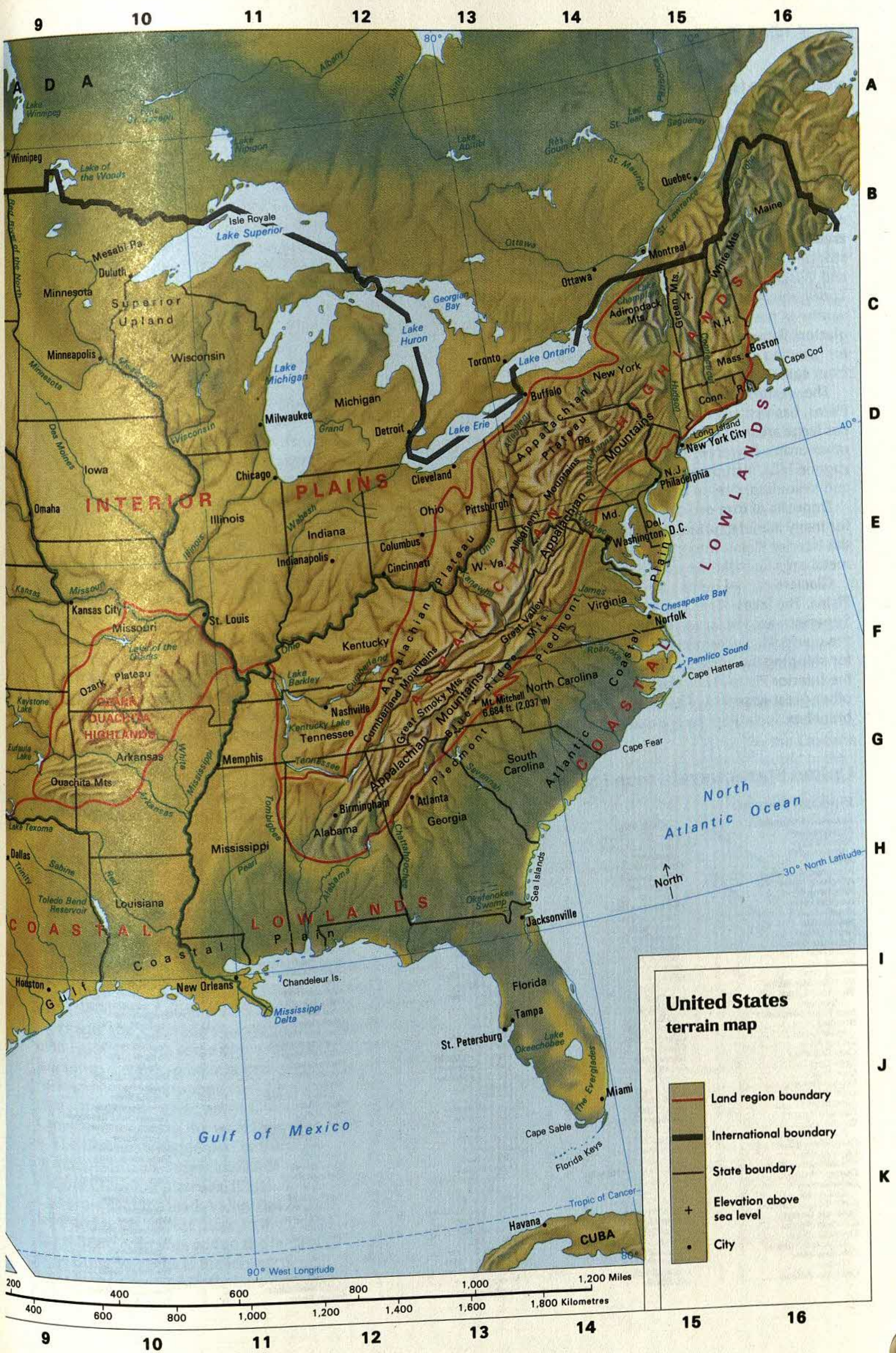
The Gulf Coastal Plain borders the Gulf of Mexico from Florida to southern Texas. Numerous rivers—including the Alabama, Mississippi, Rio Grande, and Trinity—cross the plain and flow into the Gulf. The Mississippi, which originates in the Interior Plains to the north, is the most important of these rivers. Barges carrying cargoes from many parts of the country travel along the river. Soil deposited along the banks of the Mississippi and other rivers in the Gulf Coastal Plain

Fields of wheat grow near a rural Montana community on the Interior Plains. The plains, America's vast heartland, stretch from the Appalachian Highlands to the Rocky Mountains.



Rugged hills border a valley in northwestern Arkansas, which is part of the Ozark-Ouachita Highlands. This region also includes parts of Missouri and Oklahoma.

1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
H
I
J
K
Vancouver Island
Vancouver
Strait of Juan de Fuca
Puget Sound
Calgary
South Saskatchewan
Lake Winnipegosis
Assiniboine
Lake Manitoba
C A N
Franklin D. Roosevelt Lake
Seattle
Mt. Rainier 14,410 ft. (4,392 m)
Mt. St. Helens
Cascade Range
Washington
Columbia
Snake
Bitterroot
Lewis Range
Continental Divide
Milk
Missouri
Fort Peck Lake
Lake Sakakawea
North Dakota
Bismarck
Portland
Willamette Valley
Coast Ranges
Blue Mts.
Salmon River Mountains
Butte
Montana
Yellowstone
Billings
Oregon
PACIFIC RANGES AND LOWLANDS
Harney Basin
Boise
Idaho
Snake River Plain
ROCKY MOUNTAINS
Big Horn Mts.
Powder
Great Plains
Lake Oahe
South Dakota
Black Hills
Harney Peak 7,242 ft. (2,207 m)
Cape Mendocino
40°
Goose Lake
Bannett Peak 13,804 ft. (4,207 m)
Wind River Ra.
Wyoming
Pyramid Lake
Humboldt
Great Salt Lake
Wyoming Basin
North Platte
Niobrara
Central Valley
Sierra Nevada
Reno
Nevada
Salt Lake City
Wasatch Ra.
Uinta Mts.
Sand Hills
Nebraska
Lake Tahoe
Utah Lake
San Francisco
California
WESTERN PLATEAUS, BASINS, AND RANGES
Great Basin
Utah
Green
Front Range
South Platte
Denver
INTERIOR PLAINS
San Joaquin
Colorado
Mt. Elbert 14,433 ft. (4,399 m)
Pikes Peak 14,110 ft. (4,301 m)
Mt. Whitney 14,495 ft. (4,418 m)
Lake Powell
Colorado Plateau
San Juan
Arkansas
Kansas
Bakersfield
Death Valley 282 ft. (86 m) below sea level
Lake Mead
San Juan Mts.
San Luis Valley
Sangre de Cristo Mts.
Grand Canyon
Painted Desert
Mojave Desert
Los Angeles
Channel Islands
Santa Fe
Continental Divide
Mogollon Rim
Arizona
Albuquerque
New Mexico
Canadian
Amarillo
Oklahoma
Oklahoma City
Red
Salton Sea
Colorado Desert
North Pacific Ocean
San Diego
Imperial Valley
Phoenix
Gila
Sonora Desert
Rio Grande
Llano Estacado
30° North Latitude
North
120° West Longitude
Gulf of California
110°
El Paso
Guadalupe Mts.
Brazos
Texas
Colorado
Pecos
Edwards Plateau
Santiago Mts.
Amistad Reservoir
MEXICO
San Antonio
Nueces
Corpus Christi
Falcon Lake
Padre Island
100°
RUSSIA
Arctic Circle
60° North Latitude
Arctic Ocean
Brooks Range
Bering Strait
Continental Divide
Alaska
Yukon
St. Lawrence I.
St. Matthew I.
Tanana
Mt. McKinley 20,320 ft. (6,194 m)
Alaska Range
Nunivak I.
Kuskokwim
Bering Sea
Attu I.
Anchorage
North
Mt. St. Elias 18,008 ft. (5,489 m)
CANADA
Gulf of Alaska
Aleutian Islands
Kodiak I.
North Pacific Ocean
Alexander Archipelago
180°
160° West Longitude
140°
160° West Longitude
North Pacific Ocean
Kauai
Niihau
Hawaii
Oahu
Honolulu
Molokai
Maui
Lanai
Kahoolawe
20° North Latitude
Hawaii
Mauna Kea 13,796 ft. (4,205 m)
0
500
1,000
1,500
2,000 Miles
0
500
1,000
1,500
2,000
2,500
3,000 Kilometres
0
200



United States terrain map

creates fertile farmland. The plain also has belts of hilly forests and grazing land, and large deposits of petroleum and natural gas lie beneath it and in the offshore Gulf waters. The Gulf Coastal Plain has many sandy beaches, swamps, bays, and offshore islands.

The Interior Plains occupy a huge expanse of land that stretches from the Appalachian Highlands in the east to the Rocky Mountains in the west. Glaciers covered much of the region during the Ice Age. They stripped the topsoil from parts of Michigan, Minnesota, and Wisconsin and carved out thousands of lakes. Today, much of this area is heavily forested. Farther south—in parts of Illinois, Indiana, Iowa, and Ohio—the glaciers flattened the land and deposited rich soil ideal for growing crops. The plains slope gradually upward from east to west and get progressively drier.

The western part of the region, called the Great Plains, has vast grasslands where livestock graze. It also has large areas of fertile soil that yield maize, wheat, and other crops. Few trees grow on the Great Plains. Some rugged hills, including the Black Hills of South Dakota and Wyoming, rise up out of the plains.

Deposits of iron ore and coal provide raw materials for many manufacturing industries in the eastern part of the Interior Plains. Important deposits of petroleum and metal ores lie in the western part.

Glaciers carved out the five Great Lakes in the Interior Plains. The lakes—Erie, Huron, Michigan, Ontario, and Superior—are the largest group of freshwater lakes in the world. The lakes provide a vital transportation route for shipping the agricultural and industrial products of the Interior Plains. The Mississippi River is the region's other great waterway. The Mississippi and its many branches, including the Missouri and Ohio rivers, form a river system that reaches into all parts of the Interior Plains.

The Ozark-Ouachita Highlands rise up between the Interior Plains and Coastal Lowlands. The highlands form a scenic landscape in southern Missouri, northwest Arkansas, and eastern Oklahoma. The region is named for the Ozark Plateau and the Ouachita Mountains. Rivers and streams have cut deep gorges through the rugged highland terrain. The highlands include forested hills, artificial lakes, and many underground caves and gushing springs. Much of the region has poor soil for farming but fertile land lies along the river valleys. Deposits of coal, iron ore, and other minerals are valuable natural resources of the highlands.

The Rocky Mountains form the largest mountain system in North America. They extend from northern Alaska, through Canada and the western United States to northern New Mexico. Many peaks of the Rockies are more than 4,250 metres high. The *Continental Divide,* or *Great Divide,* passes through the mountains. It is an imaginary line that separates streams that flow into the Pacific Ocean from those that flow into the Atlantic. Many important rivers, including the Colorado, Missouri, and Rio Grande, begin in the Rockies.

Forests cover the lower mountain slopes. The *timber line* marks the elevation above which trees cannot grow. Grasses, mosses, and lichens grow above the line. Bighorn sheep, elk, deer, bears, mountain lions, and other animals live in the mountains. Lakes and streams add to the region's spectacular beauty.

Timber production and mining are important industries in the Rockies. The mountains are a storehouse of such metals as copper, gold, lead, silver, and zinc. The region also has large deposits of oil and natural gas.

United States terrain map index

Physical features

Adirondack Mountains	C	14
Alabama River	H	12
Alaska Range (mountains)	J	4
Aleutian Islands	K	2
Alexander Archipelago	K	6
Allegheny Mountains	E	13
Allegheny River	D	13
Amistad Reservoir	I	7
Appalachian Mountains	E	14
Appalachian Plateau	D	14
Arctic Ocean	I	5
Arkansas River	F	7
Attu Island	J	1
Bering Sea	J	2
Bering Strait	I	3
Big Horn Mountains	C	6
Bitterroot Range (mountains)	B	4
Blue Ridge Mountains	G	13
Brooks Range (mountains)	I	4
Brazos River	H	8
Canadian River	G	7
Cape Cod	C	16
Cape Fear	G	14
Cape Hatteras	F	15
Cape Mendocino	D	1
Cape Sable	J	14
Cascade Range	C	3
Central Valley (California)	E	2
Chandeleur Islands	I	11
Channel Islands	G	2
Chattahoochee River	H	12
Chesapeake Bay	F	15
Coast Ranges (California)	E	1
Coast Ranges (Oregon)	C	2
Colorado Desert	G	3
Colorado Plateau	F	4
Colorado River (Colorado-Arizona)	E	6
Colorado River (Texas)	H	8
Columbia Plateau	B	3
Columbia River	B	3
Connecticut River	C	15
Continental Divide (watershed)	G	5
Cumberland Mountains	G	12
Cumberland River	F	12
Death Valley (desert)	F	3
Des Moines River	D	9
Edwards Plateau	I	7
Eufaula Lake	G	9
Everglades, The	J	14
Falcon Lake	J	8
Flathead River	B	4
Flathead Lake	B	5
Florida Keys	K	14
Fork River	B	4
Fort Peck Lake	B	6
Franklin D. Roosevelt Lake	A	3
Gannett Peak	D	5
Georgian Bay	C	13
Gila River	G	4
Goose Lake	D	2
Grand Canyon	F	4
Grand River	D	12
Great Basin	E	3
Great Plains	D	7
Great Salt Lake	D	4
Great Smoky Mountains	G	12
Great Valley (Appalachians)	F	13
Green Mountains	C	15
Green River	E	5
Guadaloupe Mountains	H	6
Gulf Coastal Plain	I	10
Gulf of Alaska	K	5
Gulf of California	H	3
Gulf of Mexico	J	11
Harney Basin	C	3
Hawaii (island)	K	7
Hudson River	D	15
Humboldt River	D	3
Illinois River	E	10
Imperial Valley	G	3
Isle Royale	B	11
James River (South Dakota)	D	8
James River (Virginia)	F	14
Juan de Fuca, Strait of	A	2
Kahoolawe (island)	K	7
Kanawha River	E	13
Kansas River	E	9
Kauai (island)	J	6
Kentucky Lake	G	11
Keystone Lake	G	9
Klamath River	C	2
Kodiak Island	K	4
Kuskokwim River	J	4
Lake Barkley	F	11
Lake Champlain	C	15
Lake Erie	D	13
Lake Huron	C	12
Lake Mead	F	3
Lake Michigan	C	11
Lake Oahe	C	8
Lake of the Ozarks	F	10
Lake of the Woods	B	9
Lake Okeechobee	J	14
Lake Ontario	C	14
Lake Powell	F	5
Lake Sakakawea	B	8
Lake Superior	B	11
Lake Tahoe	E	2
Lanai (island)	J	7
Lewis Range (mountains)	B	5
Llano Estacado (Texas Panhandle)	G	7
Long Island	D	15
Mauai (island)	J	7
Mauna Kea (volcano)	K	7
Mesabi Range (mountains)	B	10
Milk River	B	6
Minnesota River	C	9
Mississippi Delta	I	11
Mississippi River	G	10
Missouri River	D	8
Mogollon Rim	G	4
Mojave Desert	F	3
Molokai (island)	J	7
Mount Elbert	E	6
Mount McKinley	J	4
Mount Mitchell	G	13
Mount Rainier	B	2
Mount St. Elias	K	5
Mount St. Helens	B	2
Mount Whitney	F	2
Niihau (island)	J	6
Niobrara River	D	8
North Atlantic Ocean	H	15
North Pacific Ocean	G	1
North Platte River	D	7
Nueces River	J	8
Nunivak River	J	3
Oahu (island)	J	7
Ohio River	F	11
Okefenokee Swamp	H	13
Ouachita Mountains	G	9
Ozark Mountains	G	9
Ozark Plateau	F	9
Padre Island	J	8
Painted Desert	F	4
Pamlico Sound (inlet of the sea)	F	15
Pearl River	H	11
Pecos River	I	7
Pend Oreille (river)	A	4
Pend Oreille (lake)	A	4
Piedmont	G	13
Pikes Peak	E	6
Platte River	E	8
Potomac River	E	14
Powder River	C	6
Puget Sound (inlet of the sea)	A	2
Pyramid Lake	D	2
Red River	G	7
Red River of the North	B	9
Republican River	E	8
Rio Grande (river)	I	7
Roanoke River	F	14
Rocky Mountains	C	5
Sabina River	H	9
Sacramento River	D	2
St. John River	B	16
St. Lawrence Island	J	3
St. Matthew Island	J	2
Salmon River	C	4
Salmon River Mountains	C	4
Salton Sea	G	3
San Joaquin River	E	2
San Juan Mountains	F	5
San Juan River	F	5
San Luis Valley	F	6
Santiago Mountains	I	6
Savannah River	G	13
Sea Islands	H	14
Sierra Nevada (mountain range)	E	2
Snake River	D	4
Snake River Plain	C	4
Sonora River	G	3
South Platte River	E	7
Strait of Juan de Fuca	A	2
Superior Upland	C	10
Susquehanna River	D	14
Tanana River	J	5
Tennessee River	G	11
Toledo Bend Reservoir	H	9
Tombigbee River	G	11
Trinity River	H	9
White Mountains	B	15
Uinta Mountains	E	5
Utah Lake	E	4
Vancouver Island	A	2
Wabash River	E	11
Wasatch Range (mountains)	D	5
White River	G	10
Willamette Valley	B	2
Wind River Range (mountains)	D	5
Wisconsin River	D	10
Wyoming Basin	D	5
Yellowstone Lake	B	5
Yellowstone River	C	6
Yukon River	J	5

The Pacific Coast forms the western border of the Pacific Ranges and Lowlands region, which extends from Canada to Mexico. Rugged rock formations line parts of the coast, including the California area shown on the left.

Mountain meadows provide grazing land for beef and dairy cattle, and valleys are used for growing crops.

For many years, the Rockies formed a major barrier to transportation across the United States. In the 1860's, the nation's first transcontinental rail line was built, passing through the Rocky Mountain region at the Wyoming Basin. Today, other railways and major roads cut through tunnels and passes in the mountains, and aeroplanes fly over the mountains.

The Western Plateaus, Basins, and Ranges lie west of the Rocky Mountains. This region extends from Washington south to the Mexican border. It is the driest part of the United States. Parts of it are wastelands with little plant life. But the region has some forested mountains, and some fertile areas where rivers provide irrigation water necessary for growing crops. In other areas, livestock graze on huge stretches of dry land.

The Columbia Plateau occupies the northernmost part of the region. It has fertile volcanic soil, formed by lava that flowed out of giant cracks in the earth thousands of years ago. The Colorado Plateau lies in the southern part of the region. It has some of the nation's most unusual landforms, including natural bridges and arches of solid rock and huge, flat-topped rock formations. The plateau's spectacular river gorges, including the Grand Canyon, rank among the world's great natural wonders.

The Basin and Range part of the region is a vast area of mountains and desert lowlands between the Columbia and Colorado plateaus. It includes Death Valley in California. Part of Death Valley lies 86 metres below sea level and is the lowest place in the United States. The Great Basin is an area within the larger Basin and Range area. Great Salt Lake is the largest of many shallow, salty lakes in the Great Basin. Bathers cannot sink in Great Salt Lake because the high salt content provides great buoyancy, enabling swimmers to float with ease. Near the lake is the Great Salt Lake Desert, which includes a large, hard, flat bed of salt.

The Pacific Ranges and Lowlands stretch across western Washington and Oregon and most of California. The region's eastern boundary is formed by the Cascade Mountains in the north and by the Sierra Nevada in the south. Volcanic activity formed the Cascades. Two of the Cascades—Lassen Peak in California and Mount Saint Helens in Washington—are active volcanoes. Some of the range's highest peaks have glaciers and permanent snowfields. Evergreen forests cover the lower slopes and provide the raw materials for timber and paper products industries. The Sierra Nevada are granite mountains, dotted with lakes and waterfalls.

Broad, fertile valleys lie west of the Cascade and Sierra Nevada mountains. They include the Puget Sound Lowland of Washington, the Willamette Valley of Oregon, and the Central Valley of California. Valley farms produce large amounts of fruits and vegetables.

West of the valleys, the Coast Ranges line the Pacific shore. In many places, they rise up abruptly from the ocean, creating craggy walls of rock. In other areas, the mountains lie behind sandy coastal plains. Deep bays that jut into the coast include Puget Sound, Columbia River Bay, San Francisco Bay, and San Diego Bay.

The San Andreas Fault runs through the Coast Ranges in California. It is a break in the earth where movements of the earth's crust cause occasional earthquakes. Giant redwood trees grow on the mountains in northern California. Set among the Coast Ranges are a number of rich agricultural valleys that produce much of the nation's lettuce, dried fruit, and wine grapes.

Climate

The climate of the United States varies greatly from place to place. Average annual temperatures range from −13° C in Barrow, Alaska, to 25.7° C in Death Valley, California. The highest temperature ever recorded in the country was 57° C. It was registered at Death Valley on July 10, 1913. The lowest recorded temperature was −62° C. It was registered at Prospect Creek, near Barrow, Alaska, on Jan. 23, 1971.

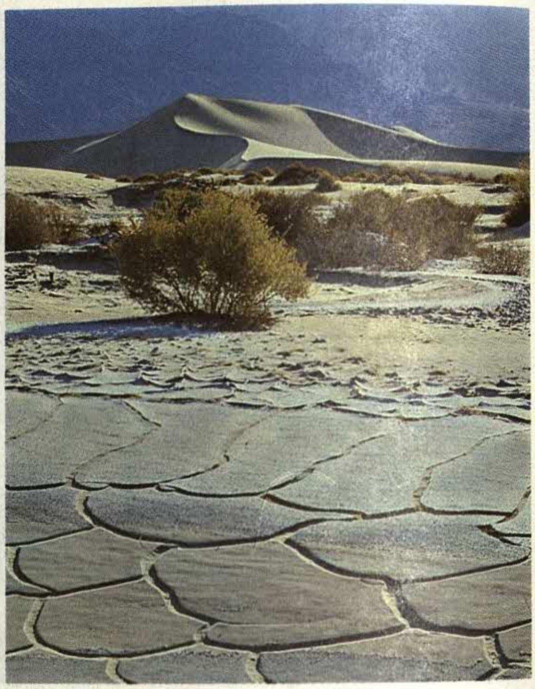
Precipitation (rain, snow, hail, and other forms of moisture) ranges from a yearly average of less than 5 centimetres at Death Valley to about 1,170 centimetres at Mount Waialeale in Hawaii. In general, however, most parts of the United States have seasonal changes in temperature and moderate precipitation.

The Midwest, the Middle Atlantic States, and New England experience warm summers and cold, snowy winters. In the South, summers are long and hot, and winters are mild. Along the Pacific Coast, and in some other areas near large bodies of water, the climate is relatively mild all year round.

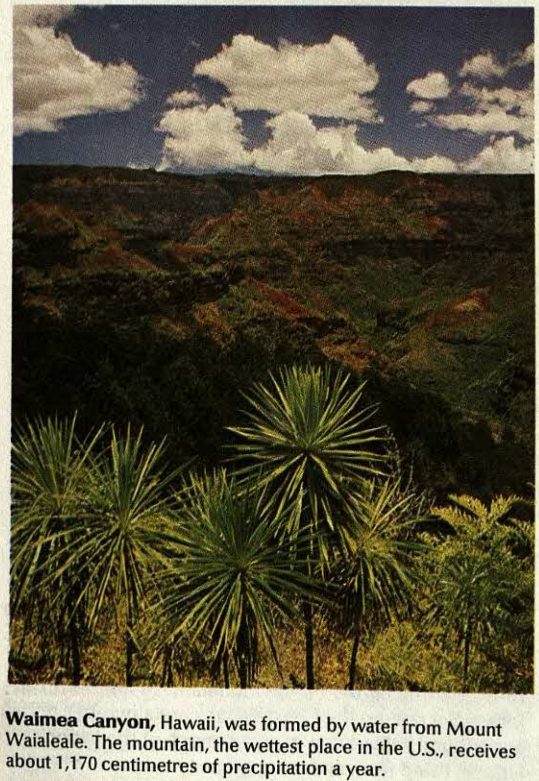
Mountains also affect the climate. In the West, for example, the mountainous areas are cooler and wetter than the neighbouring plains and plateaus. Parts of the West and Southwest of the United States have a desert climate.

The moderate climate in much of the United States has encouraged widespread population settlement. It has also helped make possible the production of a great variety of agricultural goods.

See **North America** (Climate).



Death Valley, California, the country's driest place, receives less than 5 centimetres of precipitation yearly. It recorded the highest U.S. temperature ever, 57° C.



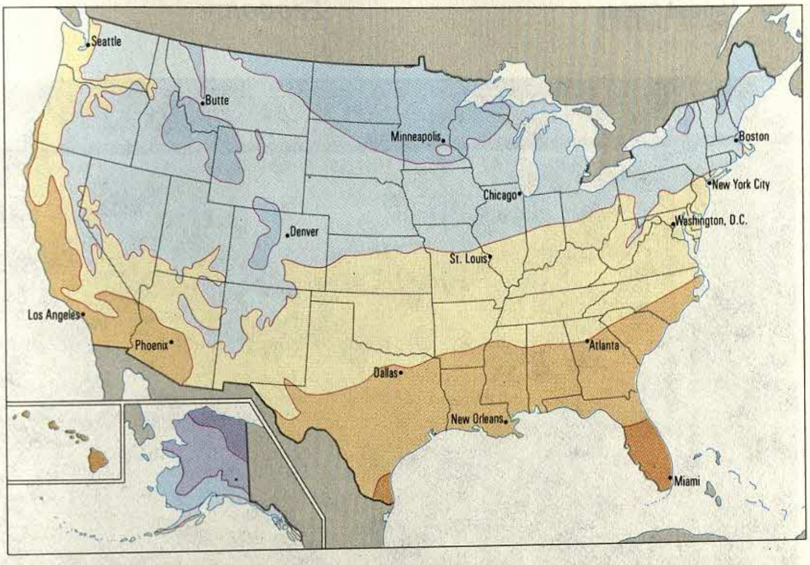
Waimea Canyon, Hawaii, was formed by water from Mount Waialeale. The mountain, the wettest place in the U.S., receives about 1,170 centimetres of precipitation a year.

Prospect Creek, Alaska, recorded the lowest U.S. temperature ever, −62° C. The nearby town of Barrow has the country's lowest average annual temperature, −13° C.

Average January temperatures

The southern and far western parts of the United States have milder winters than the rest of the country. This map shows how average January temperatures generally decrease from south to north.

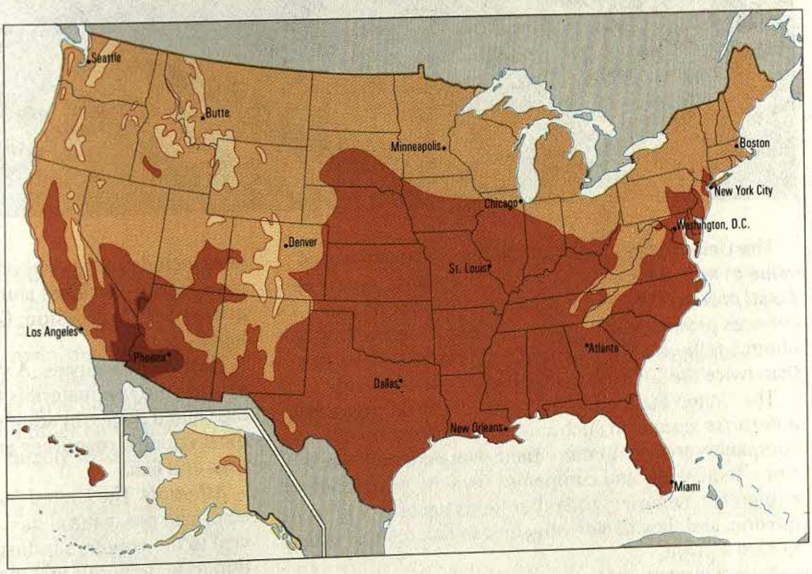
Degrees Fahrenheit	Degrees Celsius
Over 60	Over 16
45 to 60	7 to 16
30 to 45	−1 to 7
15 to 30	−9 to −1
0 to 15	−18 to −9
−15 to 0	−26 to −18
Below −15	Below −26



Average July temperatures

Average July temperatures in most of the country are between 24 and 32° C or 16 and 24° C. Temperatures are lower in most of Alaska and some mountains, and higher in the Southwest desert.

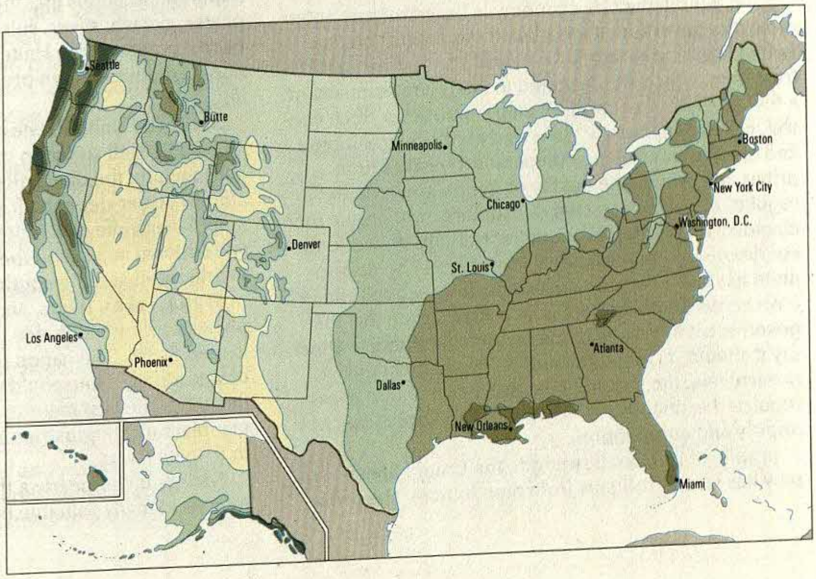
Degrees Fahrenheit	Degrees Celsius
Over 90	Over 32
75 to 90	24 to 32
60 to 75	16 to 24
45 to 60	7 to 16
Below 45	Below 7



Average yearly precipitation

This map shows that the amount of yearly precipitation in the United States generally increases from west to east. But some areas along the west coast and in Alaska and Hawaii receive the most precipitation.

Inches	Centimetres
More than 80	More than 200
60 to 80	150 to 200
40 to 60	100 to 150
20 to 40	50 to 100
10 to 20	25 to 50
Less than 10	Less than 25



Economy

America's economy produces a greater value of agricultural, manufactured, and mined products than any other country. A huge warehouse, *left,* stores grain before it is shipped to distant markets. Barges, railway carriages, trucks, and other transportation facilities are used to transport products.

The United States ranks first in the world in the total value of its economic production. The nation's *gross national product* (GNP)—the value of all the goods and services produced by a country in a year—amounted to about 5 trillion U.S. dollars in 1988. This total was more than twice the GNP of Japan, which ranked second.

The United States economy is based largely on a *free enterprise system.* In such a system, individuals and companies are free to make their own economic decisions. Individuals and companies own the raw materials, equipment, factories, and other items necessary for production, and they decide how best to use them in order to earn a profit.

Even though the U.S. economy is based on free enterprise, the government has placed regulations on economic practices through the years. It has passed antitrust laws, which are designed to keep one company or a few firms from controlling entire industries. Such control, called a monopoly, does away with competition and enables controlling companies to charge high prices and reduce the quality of goods. Government regulations have protected consumers from unsafe merchandise and protected workers from unsafe working conditions and unreasonably low wages. The government has also enacted regulations designed to reduce environmental pollution. Some people argue that the government interferes in the economy too much. Others say it should do more. In spite of involvement by the government, the United States still has one of the least regulated economies in the world. See **Capitalism; Monopoly and competition.**

In spite of its overall strength, the United States economy has faced problems from time to time. The problems include *recessions* (mild business slumps), *depressions* (severe business slumps), and *inflation* (rising prices). See **Depression; Great Depression; Recession; Inflation.**

Natural resources. A variety of natural resources provide the raw materials that support the economy of the United States. In addition to a moderate climate, the most valuable resources are minerals, soils, water, forests, and fish.

Minerals. The United States has large deposits of coal, iron ore, natural gas, and petroleum, which are vital to the country's industrial strength. Its many other important minerals include copper, gold, lead, phosphates, potash, silver, sulphur, and zinc. To meet its needs, however, the United States must import additional amounts of iron ore, petroleum, and other minerals.

Soils. The United States has vast expanses of fertile soil that is well-suited to growing crops. The most fertile soils include the dark soils of the Interior Plains and the *alluvial* (water-deposited) soils along the lower Mississippi River Valley and other smaller river valleys. Rich, wind-blown soil called *loess* covers parts of eastern Washington and the southern Interior Plains.

Water. Lakes, rivers, and underground deposits supply water for households, farms, and industries in the United States. The nation uses about 1,500 billion litres of water daily. Households use only about 10 per cent of this total. The vast majority of the rest is used to operate manufacturing industries and steam power plants, and to irrigate farms.

Forests cover nearly a third of the United States, and they yield many valuable products. About 40 per cent of

Forests are one of the many natural resources that contribute to the U.S. economy. Logs from forests are used for timber and in making other valuable products.

the nation's timber comes from the trees of forests in the Pacific Northwest. Forests in the South supply timber, wood pulp—which is used to make paper—and nearly all the turpentine, pitch, rosin, and wood tar produced in the United States. The Appalachian Mountains and parts of the Great Lakes area have fine hardwood forests. Hickory, maple, oak, and other hardwood trees cut from these forests provide quality woods for the manufacture of furniture.

Fish. Americans who fish for a living catch about 5.6 million metric tons of sea products annually. The greatest quantities are taken from the Gulf of Mexico, where important catches include menhaden, oysters, and shrimp. The Pacific Ocean supplies Alaska pollock, cod, crabs, herring, salmon, tuna, and other fish. The Atlantic yields cod, flounder, herring, menhaden, and other fish; and such shellfish as clams, lobsters, oysters, and scallops.

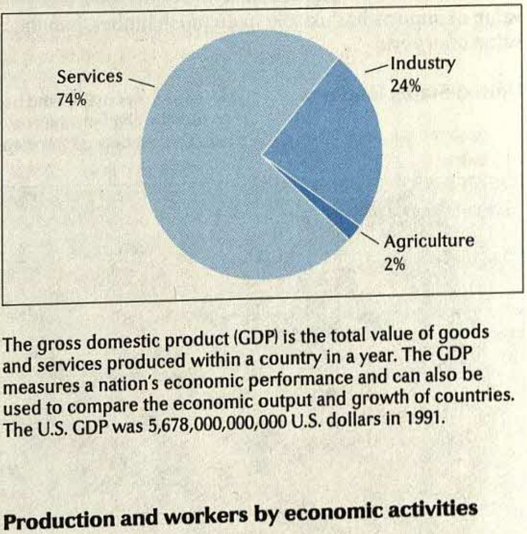
Service industries account for 74 per cent of the U.S. gross domestic product and employ 76 per cent of the country's workers. This industry group includes a wide variety of businesses that provide services rather than producing goods.

Community, social, and personal services are rated first among U.S. service industries in terms of the gross domestic product. This industry includes such establishments as doctors' offices and private hospitals, hotels, law firms, computer programming and data processing companies, restaurants, repair shops, private research laboratories, and engineering companies.

Finance, insurance, and land and property services are rated second among U.S. service industries. Banks finance much of the economic activity in the United States by lending money to both individuals and businesses. American banks lend billions of dollars annually. Most of the loans to individuals are for the purchase of houses, cars, or other major items. Loans to businesses provide an important source of money for *capital expansion*—the construction of new factories and the purchase of new equipment. As a business expands, it hires more workers. These workers, in turn, produce more goods and services. In this way, the nation's level of employment and its economic output both increase.

Other important types of financial institutions include commodity and security exchanges. Commodities are basic goods, such as grains and precious metals. Securities are certificates of investment, such as stocks and bonds. The prices of commodities and securities are determined by the buying and selling that takes place at exchanges. The New York Stock Exchange is the nation's largest security exchange. The Chicago Board of Trade is the world's largest commodity exchange.

Gross domestic product of the United States



The gross domestic product (GDP) is the total value of goods and services produced within a country in a year. The GDP measures a nation's economic performance and can also be used to compare the economic output and growth of countries. The U.S. GDP was 5,678,000,000,000 U.S. dollars in 1991.

Production and workers by economic activities

Economic activities	Per cent of GDP produced	Employed workers	
		Number of people	Per cent of total
Community, social, & personal services	20	28,147,000	25
Manufacturing	18	18,430,000	16
Finance, insurance, & property	17	6,645,000	6
Wholesale & retail trade	16	25,369,000	23
Government	12	18,737,000	17
Transportation, communication, & utilities	9	5,758,000	5
Construction	4	4,615,000	4
Agriculture, forestry, & fishing	2	3,700,000	3
Mining	2	694,000	1
Total	100	112,095,000	100

Sources: U.S. Bureau of Economic Analysis; U.S. Bureau of Labor Statistics.

The United States has the world's largest private insurance industry. The country has about 2,000 life and health insurance companies and about 3,500 property and liability companies. Land and property services are important to the economy of the United States because of the large sums of money involved in the buying and selling of property.

Wholesale and retail trade play major roles in the American economy. Wholesale trade, which includes foreign trade, takes place when a buyer purchases goods directly from a producer. The goods may then be sold to other businesses for resale to consumers. Retail trade involves selling products to the final consumer. Grocery shops, department stores, and car dealerships are examples of retail trade establishments.

Foreign trade provides markets for surplus agricultural goods and many raw materials and manufactured goods produced in the United States. The nation imports goods that it lacks entirely or that producers do not supply in sufficient quantities. It also imports goods produced by foreign companies that compete with U.S. firms. During much of the country's history, the value of U.S. exports has exceeded, or been about the same as, the value of its imports. But since the mid-1960's, the value of imports has usually been much higher than the value of exports.

Important U.S. exports include (1) machinery and transportation equipment, such as aircraft, computers, electric power equipment, industrial machinery, and motor vehicles and parts; (2) manufactured articles, especially scientific measuring equipment; (3) chemical elements and compounds, including plastic materials; (4) basic manufactures, such as metals and paper; and (5) agricultural products, especially maize and wheat.

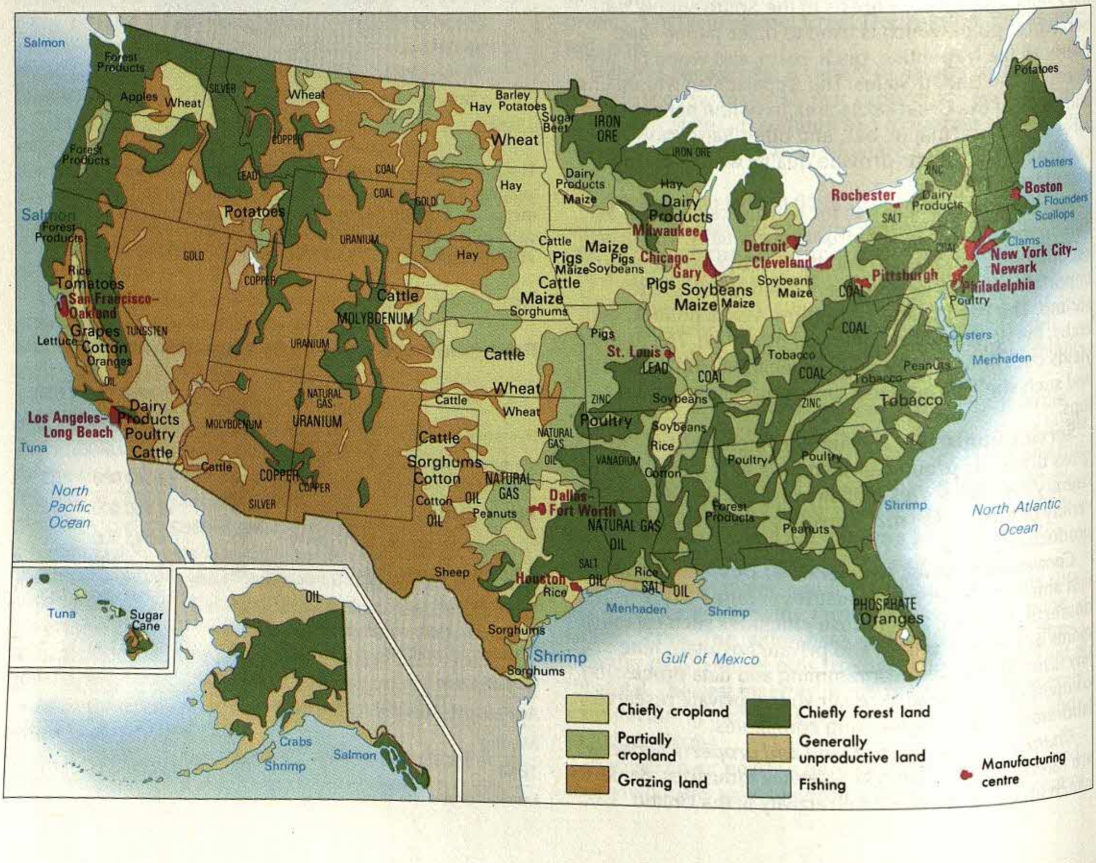
The leading U.S. imports are (1) machinery and transport equipment, such as cars and parts, engines, office machines, and telecommunications equipment; (2) manufactured articles, such as clothing, shoes, and toys; (3) mineral fuels and lubricants, especially petroleum; (4) basic manufactures, such as iron, steel, and other metals, and paper and newsprint; and (5) chemical products, such as chemical compounds and medicines.

Canada and Japan are the country's chief trading partners. Other major U.S. trading partners include Germany, Mexico, South Korea, Taiwan, and the United Kingdom.

Government services play a major role in the economy. Federal, state, and local governments employ 17 per cent of U.S. workers. Many government employees are directly involved in making public policies. Others—including police officers, postal workers, teachers, and refuse collectors—provide public services.

United States land use

This map shows major land uses in the United States, and also offshore fishing areas. Labels on the map identify chief products of various areas. The label size generally indicates product importance. Other labels on the map show the location of major manufacturing centres in the country.



The construction industry provides jobs for many Americans. Workers help put up a high-rise building in the centre of a city, *above.*

Service industries are those economic activities that provide services, rather than goods. Data processing, *above,* is one of many such industries. Others include government services and the operation of hotels and restaurants.

Federal, state, and local governments buy a fifth of all the goods and services produced in the nation. These purchases range from paper clips to office buildings. The federal government is the nation's largest single buyer of goods and services. Its agencies, including the military, buy billions of dollars worth of equipment from private companies. In addition, federal grants finance much of the nation's research activity. State governments spend most of their income on education, health care and hospitals, highways, and social security benefits. Local governments spend over a third of their income on education, and less for police and fire protection, hospitals, streets, sanitation and sewerage, and parks.

In addition to its roles as an employer and purchaser of goods and services, government influences the economy by providing income to certain groups of people. For example, the federal government makes social security payments to retired and disabled people. Federal, state, and local governments provide assistance to the needy. Such government programmes are the only source of income for some Americans.

Transportation, communication, and utilities are also important to the economy. Utility companies provide electricity, gas, telephone, and water services. More information on transportation and communication appears later in this section.

Manufacturing accounts for 18 per cent of the gross domestic product and employs 16 per cent of the workers. The value of American manufactured goods is greater than that of any other country. Factories in the United States turn out a tremendous variety of *producer goods,* such as sheet metal and printing presses; and *consumer goods,* such as cars, clothing, and TV sets. The leading categories of U.S. products are, in order of value, chemicals, transportation equipment, food products, nonelectrical machinery, electrical machinery and equipment, printed materials, scientific and medical instruments, fabricated metal products, paper products, rubber and plastic products, and primary metals.

The Midwest and Northeast have long been major U.S. centres of manufacturing. Since the mid-1900's, the country's fastest-growing manufacturing areas have been on the West Coast, in the Southwest, and in the South. Today, California is first among the states in the value of its manufactured goods, followed by Texas, Ohio, Michigan, New York, Illinois, and Pennsylvania. Manufacturers in California produce aircraft, aerospace equipment, computers and electronic components, food products, and many other goods.

Midwestern factories turn out much of the nation's iron and steel, cars, and other heavy industrial products. The Northeast has many clothing factories, food processors, printing plants, and manufacturers of electronic equipment. Petroleum refineries and petro-chemical industries account for much of the manufacturing activity in Texas and other states bordering the Gulf of Mexico. Atlanta, Dallas-Fort Worth, Seattle, and Wichita are important centres for the manufacture of aircraft and related equipment.

Through the years, Americans have developed manufacturing processes that have greatly increased productivity. During the early 1900's, U.S. car firms introduced the moving assembly line and identical interchangeable parts for cars. This led to mass production, in which large numbers of goods could be produced in less time and at a lower cost than ever before. Beginning in the mid-1900s, U.S. industries turned increasingly to *automation*—the use of machines that operate with little human help. American inventors and engineers developed computers to bring automation to an even higher level. Today, computers operate machines, handle accounting, and perform many other important functions in industries. See **Manufacturing.**

Construction accounts for 4 per cent of the U.S. gross domestic product and provides jobs for 4 per cent of the work force. This industry employs such workers as architects, engineers, contractors, bricklayers, carpenters, electricians, plumbers, roofers, ironworkers, and plasterers.

Agriculture accounts for 2 per cent of the U.S. gross domestic product and employs 3 per cent of the nation's workers. Yet, the United States is a world leader in agriculture production. The country's farms turn out as much food as the nation needs, with enough left over to export food to other countries. About a third of the world's food exports come from U.S. farms.

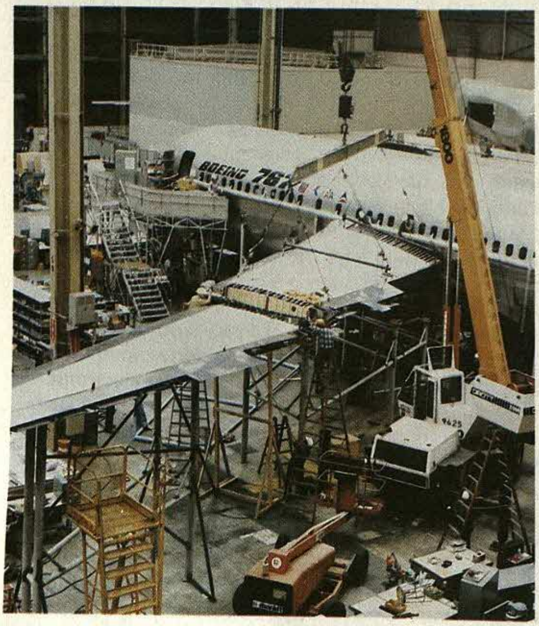
Beef cattle is the most valuable product of American farms. Millions of beef cattle are reared on huge ranches in the western United States. The South and Midwest also produce large numbers of beef cattle. Other leading farm products, in order of value, include milk, maize, soybeans, chickens and eggs, pigs, wheat, and cotton. United States farms also produce large amounts of hay, tobacco, turkeys, oranges, potatoes, tomatoes, apples, peanuts, and sorghum.

Farmers throughout the country rear dairy cattle for milk and other products. Much of the dairy production is concentrated in a belt that extends from Minnesota to New York. Midwestern states account for much of the nation's maize, soybeans, and pig production. The nation's chief wheat-growing region stretches across the Great Plains. Most of the chickens are reared in the South. California and states in the South and Southwest produce almost all the country's cotton. Farmers in various areas also produce poultry, eggs, fruit, vegetables, nuts, and many other crops.

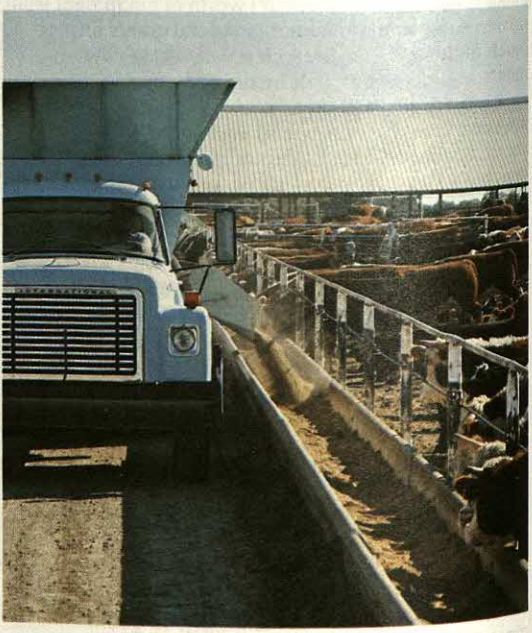
The United States has played a major role in the modernization of agriculture. During the 1800's, American inventors developed the first successful harvesting machine and steel plough. United States scientists have contributed to the development of improved plant varieties and livestock breeds, as well as agricultural chemicals for fertilizer and pest control.

The use of modern farm machinery and agricultural methods has helped make U.S. farms to be among the most efficient in the world. But it has also contributed to rapidly rising production costs. Many farmers who have been unable to meet these rising costs have been forced to leave farming and sell their land. Since 1925, the number of farms in the United States has decreased from about 6,500,000 to about 2,100,000. At the same time, average farm size increased from about 58 hectares to about 189 hectares. Some of the largest farms in the United States are owned by corporations. But more than 95 per cent of all the farms are owned by individuals or by corporations or partnerships made up of members of farm families. See **Agriculture.**

Mining. The United States is among the leading countries in the value of its mineral production. Mining accounts for 2 per cent of the gross domestic product and employs 1 per cent of the workers.



Manufacturing is one of the most important economic activities in the United States. The steps in the manufacture of an aeroplane include building a full-sized model, *above.*



Agriculture includes the raising of both crops and livestock. A mechanized system for fattening cattle for market, *above,* is one example of the efficient methods used by American farmers.

Mining provides vital raw materials for American industry. For example, a strip mine, *left,* yields coal. Coal, in turn, is used to fuel electric power plants and to make steel for many manufactured products.

The chief mineral products of the United States are, in order of value, petroleum, natural gas, and coal. The United States is third, after Russia and Saudi Arabia, in the production of petroleum. It is second to Russia in natural gas production. The United States is second-largest producer of coal—after China. Most coal deposits lie in the Interior Plains and the Appalachian Highlands. Major deposits of petroleum and natural gas occur in Alaska, California, Louisiana, Oklahoma, and Texas. Other important minerals include clays, copper, gold, granite, iron ore, limestone, phosphate rock, salt, sand and gravel, sodium carbonate, sulphur, and *trap* (a fine-grained rock).

Although mining accounts for a small share of the total economic output in the United States, it has been a key to the growth of other parts of the economy. Coal and iron ore, for example, are needed to make steel. Steel, in turn, is used to make cars, buildings, bridges, and many other goods. Coal is also a fuel for electric power plants. Refineries turn petroleum into petrol; fuel oil for heating and industrial power; and petrochemicals used in the manufacture of plastics, paint, drugs, fertilizers, and synthetic fabrics. Limestone, granite, and trap are crushed for use in construction materials. Sand and gravel are also used in construction. Sulphur and phosphates are used to make fertilizer. See **Mining.**

Energy sources. The farms, factories, households, and motor vehicles of the United States consume vast amounts of energy annually. Various sources are used to generate the energy. Petroleum provides about 40 per cent. It is the source of most of the energy used to power motor vehicles, and it heats millions of houses and factories. Natural gas generates about 25 per cent of the energy used. Many industries use gas for heat and power and millions of households burn it for heat, cooking, and drying laundry. Coal is the source of about 25 per cent of all the energy. Its major uses are in the production of electricity and steel. The electricity lights buildings and powers factory and farm machinery. Hydroelectric and nuclear power plants each generate about 5 per cent of America's energy.

Since the mid-1900s, the cost of energy—especially the petroleum portion—has risen dramatically. The rising cost became a major contributor to inflation in the United States and other countries. For more details, see **Energy supply.**

Transportation. A sprawling transportation network spreads out over the United States. Motor vehicles drive on about 6,200,000 kilometres of streets, roads, and highways in the country. The United States has an average of about 75 cars for every 100 people. Americans use cars for most of their personal travel. Trucks carry nearly 25 per cent of the freight in the United States.

The United States has about 240,000 kilometres of railway lines. Railways are the leading freight carriers in the United States, handling more than 35 per cent of the freight. But they account for less than 1 per cent of all passenger traffic. See **Railway.**

Airlines handle about 18 per cent of all U.S. passenger traffic, but less than one-half of 1 per cent of the freight traffic. Chicago-O'Hare International Airport is the world's busiest airport. See **Airport; Aviation.**

About 15 per cent of the freight traffic in the United States travels on waterways. The Mississippi River system handles more than half of this freight. Ships and

A network of roads crisscrosses the United States. Roads form a key part of the nation's excellent transportation system. The construction and repair of roads provides jobs for people throughout the country.

barges travelling on the Mississippi and its branches, including the Arkansas, Missouri, and Ohio rivers, can reach deep into the country's interior. The Great Lakes form the nation's other major inland waterway. The St. Lawrence Seaway links the lakes with the Atlantic Ocean.

There are many major ports in the United States. New Orleans ranks as the busiest port in the nation, followed by the ports of New York City and Houston.

The nation has a vast network of pipelines that carries crude oil, petroleum products, and natural gas. Pipelines account for nearly 25 per cent of the total freight handled in the United States.

Communication. Private corporations operate the publishing and broadcasting industries in the United States. The First Amendment of the Constitution guarantees freedom of the press and speech. These guarantees allow newspapers and broadcasters to operate without government censorship. Laws prohibit the publishing or broadcasting of libellous, obscene, and treasonous materials. But, for the most part, the government interferes little in the operation of the communication industry. The free exchange of ideas and information is a vital part of the democratic heritage of the United States.

Publishers in the United States issue about 1,600 daily newspapers, which have a total circulation of more than 60 million copies. The nation also has about 7,000 weekly and semiweekly newspapers. The newspapers provide information on local, national, and international events.

In the United States, most newspapers chiefly serve a local region. However, *The Wall Street Journal, USA Today, The New York Times,* and *The Christian Science Monitor* circulate throughout most of the country. *The Wall Street Journal*, which specializes in business news, has the largest circulation among U.S. newspapers.

There are more than 11,300 radio stations, about 1,500 television stations, and about 8,500 cable TV systems in the United States. Radio and TV provide entertainment, news, and public interest programmes. In the United States, both national networks and local stations produce and broadcast programmes. Almost every household has at least one TV set and one or more radios, and more than half of the households subscribe to cable TV.

There are many major ports in the United States. Houston, Texas, *above*, is one of the nation's busiest.

Study aids

Related articles in *World Book.* See the separate article on each U.S. state. See also the following:

Arts

Abstract art
American literature
Architecture
Ashcan School
Blues
Country music
Dancing
Drama
Film industry
Guggenheim Museum
Hudson River School
Jazz
Minstrel show
Museum
Music
Musical comedy
Novel
Painting
Photography
Poetry
Pop art
Popular music
Ragtime
Rock music
Sculpture
Skyscraper
Theatre

Cities and towns

Anchorage
Atlanta
Atlantic City
Baltimore
Birmingham
Boston
Buffalo
Chicago
Cincinnati
Cleveland
Dallas
Denver
Detroit
Dodge City
Honolulu
Houston
Indianapolis
Kansas City
Las Vegas
Los Angeles
Louisville
Memphis
Miami
Milwaukee
Minneapolis
Nashville
New Orleans
New York City
Oklahoma
Palm Springs
Philadelphia
Phoenix
Pittsburgh
Reno
Richmond
Saint Louis
Salt Lake City
San Antonio
San Diego
San Francisco
Seattle
Washington, D.C.

Education

Education
Harvard University
School
University
Yale University

Outlying areas

American Samoa
Caroline Islands
Guam
Line Islands
Mariana Islands
Marshall Islands
Midway Island
Puerto Rico
Virgin Islands of the United States
Wake Island

Physical features

Allegheny Mountains
Appalachian Mountains
Blue Ridge Mountains
Cape Cod
Cascade Range
Catskill Mountains
Chesapeake Bay
Coast Ranges
Columbia River
Death Valley
Everglades
Florida Keys
Grand Canyon National Park
Grand Coulee Dam
Great Divide
Great Lakes
Great Plains
Great Salt Lake
Great Smoky Mountains
Hoover Dam
Hudson River
Lake Erie
Lake George
Lake Huron
Lake Michigan
Lake Ontario
Lake Saint Clair
Lake Superior
Long Island
Mauna Kea
Mauna Loa
Mississippi River
Missouri River
Mount Rushmore National Memorial
Mount Saint Helens
Niagara Falls
Ohio River
Olympic Mountains
Puget Sound
Rio Grande
Rocky Mountains
Saint Lawrence Seaway
San Andreas Fault
Soo Canals
Yellowstone National Park
Yellowstone River
Yosemite National Park

Other related articles

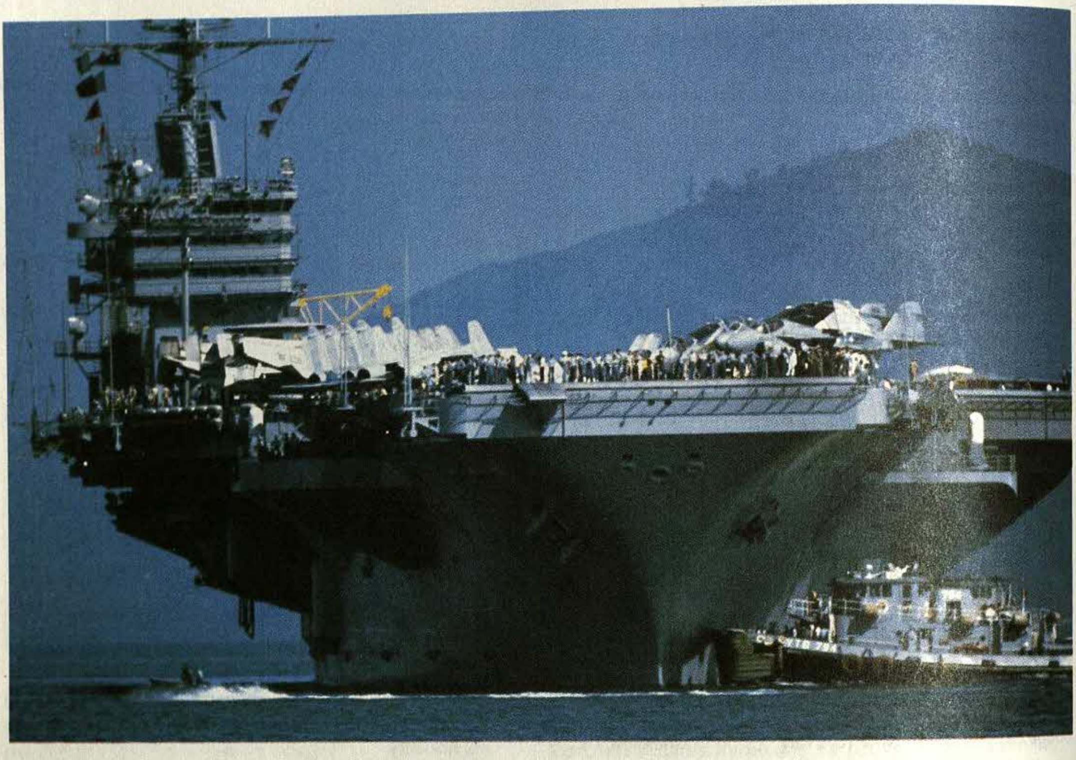
Advertising
Aeroplane
American Telephone and Telegraph Company
Amish
Baseball
Basketball
Cape Canaveral
Car
Central Intelligence Agency
Cotton
Cowboy
District of Columbia
Federal Bureau of Investigation
Flag
Football, American
Ford Motor Company
Fort Knox
General Electric Company
General Motors Corporation
Golden Gate Bridge
Hollywood
Immigration
Indian, American
Johnson Space Center
Kentucky Derby
Library
Minority group
Mormons
Pentecostal churches
Quakers
Rand Corporation
Rockefeller Foundation
Rodeo
Segregation
Space exploration
Star-Spangled Banner
Statue of Liberty
Uncle Sam
United States, Armed services of the
United States, Government of the
United States, History of the
Wall Street

Outline

I. The nation
  A. Political divisions
  B. Regions
  C. Outlying areas
II. People
  A. Population
  B. Ancestry
  C. Language
III. Way of life
  A. Urban life
  B. Rural life
  C. Education
  D. Religion
  E. Recreation
  F. Food
IV. Arts
V. Land
  A. The Appalachian Highlands
  B. The Coastal Lowlands
  C. The Interior Plains
  D. The Ozark-Ouachita Highlands
  E. The Rocky Mountains
  F. The Western Plateaus, Basins, and Ranges
  G. The Pacific Ranges and Lowlands
VI. Climate
VII. Economy
  A. Natural resources
  B. Service industries
  C. Manufacturing
  D. Construction
  E. Agriculture
  F. Mining
  G. Energy sources
  H. Transportation
  I. Communication

Questions

How does the United States rank among the countries of the world in population and area?
Why is the country called a *melting pot*?
What are the country's main land regions?
How does mineral production contribute to other parts of the American economy?
What are some of the U.S.'s leading farm products?
What are some of the reasons why the United States changed from a rural nation to an urban nation?
Where is the lowest land in the United States?
What are some problems that are faced by schools in the United States?
What are the major religions in the United States?
What are some positive and negative features of U.S. urban life and rural life?



Aircraft carriers provide the main striking power of the United States Navy's surface fleet. In the photograph above, a tugboat escorts the carrier U.S.S. *Carl Vinson* into port.

United States, Armed services of the. The armed services of the United States are the most powerful in the world. They have been held in high regard by American people since the United States declared independence in 1776. The U.S. military services split during the American Civil War (1861-1865), but ever since they have provided a strong defensive and offensive counter to the nation's enemies.

U.S. armed services were heavily engaged in both world wars. They formed the bulk of the United Nations forces in the Korean War (1950-1953). In the 1960's and early 1970's, American forces fought a long war against the Communists in Vietnam. In the 1980's and 1990's, U.S. forces have been deployed in the Caribbean, Central America, and the Middle East.

The United States armed forces are divided into four major services; the navy, the marines, the army, and the air force.

Strength of the U.S. armed services

The U.S. Navy is the largest in the world. At the beginning of the 1990's, it had a strength of about 535,000 men and about 70,000 women. These figures included some 75,000 members of the U.S. Naval Reserve. It has about 240 front-line surface warships and about 130 submarines. These are supported by about 60 amphibious assault craft, and about 150 support vessels. U.S. naval ships are assigned to one of four huge fleets stationed throughout the world.

Major units of the U.S. Navy include 36 ballistic-missile submarines, and 97 other submarines. It has 14 aircraft carriers, each carrying about 85 aircraft. There are four recommissioned battleships, built in the 1940's, and 31 cruisers. All but four of the submarines are nuclear powered. Five aircraft carriers and nine cruisers are also nuclear powered.

The U.S. Marine Corps is a separate branch of the U.S. armed services, within the Department of the Navy. It is proud of its independence. Its motto is *Semper Fidelis* (Always Faithful). This motto, together with the Marine Corps emblem, was adopted in 1868. The modern Marine Corps has a strength of almost 185,000 men, and 10,000 women. Active marine units are deployed in one of three divisions, each with three brigades, or in one of two battalion-sized Marine Corps Combat Security Forces. The corps has its own armour, artillery, and amphibious armoured personnel carriers, as well as an air wing with both fighter and fighter-ground attack squadrons.

The Marine Corps maintains forces at sea to protect United States interests abroad. It can undertake amphibious landings. Marines provide protection for United States bases, consulates, embassies, and legations.

The U.S. Army is the largest and oldest of the U.S. armed services. Its traditions date from June 14, 1775, when the Continental Congress created the first 10 companies of the Continental Army. At the beginning of the 1990's, about half of the army's combat-ready troops were stationed abroad, many in Europe. However, German reunification and the easing of East-West tension in

Europe have led to troop reductions. The majority of U.S. troops normally serve in the United States.

The army has about 770,000 serving personnel, including approximately 75,000 women. It includes an airborne and air-portable division, four special forces groups, and a Ranger regiment. It is supported by 12 divisions in the Army Reserve, and by the National Guard, which can mobilize a further 10 divisions. The army has some 15,000 tanks, more than 9,000 helicopters, and about 30,000 personnel carriers.

The U.S. Air Force is the youngest of the U.S. armed services. Until 1947, it was a branch of the army. The air service received its first aeroplane, a biplane, from the Wright brothers in 1909. U.S. pilots took part in aerial battles in World War I (1914-1918). After the United States entered World War II in 1941, its fighters and bombers played a vital part in both the European and Pacific campaigns. U.S. supply aircraft helped sustain more than two million people in 1948-1949 during the Berlin airlift. During the Korean War, U.S. pilots in *Sabre* jets fought Soviet-built *MiG* fighters in the first all-jet air battles. In April 1986, the air force carried out a controversial air raid against Libya, and, in 1991, U.S. air units were used in the Persian Gulf War (see **Persian Gulf War**).

The air force has about 550,000 uniformed personnel, including approximately 70,000 women. It has nearly 400 strategic bombers, including B-2 advanced technology stealth bombers, and over 3,500 tactical fighters, including the top-secret F-117 stealth fighter. There are 41 squadrons equipped with air-superiority fighters, and 38 squadrons with fighter-ground attack aircraft. There are seven reconnaissance squadrons. Seven special operations squadrons are equipped with modified helicopters and Hercules transports. There are 33 other transport squadrons, giving the air force a massive airlift capability.

Life in the armed forces

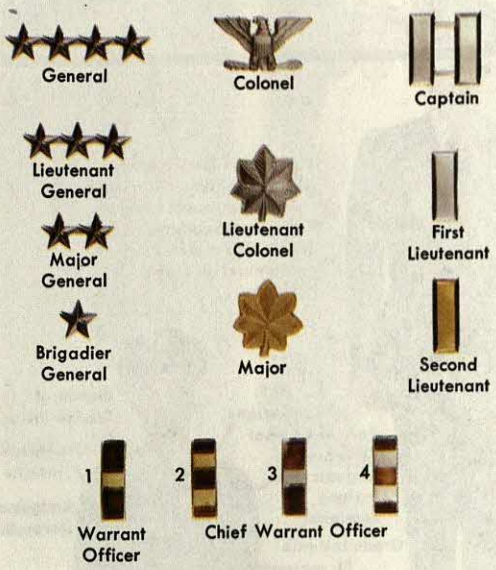
Areas of operation. In 1973, the United States ended the *draft* (conscription). Today, all its service personnel are volunteers. All U.S. armed forces operate within the North Atlantic Treaty Organization (NATO) alliance. However, in the 1990's, with an improvement in East-West relations, United States foreign policy and military emphasis has begun to concentrate on the Pacific and Middle East regions.

The U.S. Navy operates fleets in all the major oceans of the world. The 2nd Fleet is based in the Atlantic, the 3rd in the Pacific, the 6th in the Mediterranean, and the 7th in the western Pacific. It has huge naval bases on both the west and east coasts of the United States, as well as others in Hawaii, Japan, and the Philippines.

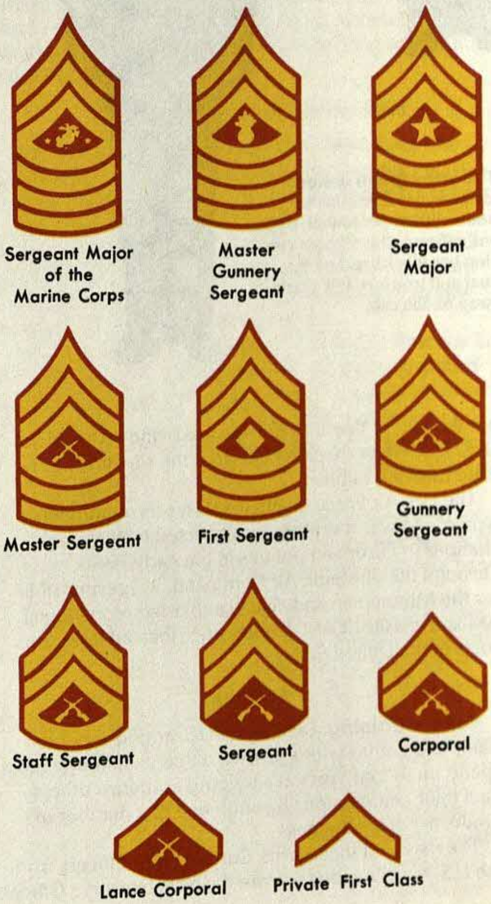
Traditionally, the Marine Corps regards the Pacific as its main theatre of operation. However, marines have landed in other parts of the world, such as the Persian Gulf in 1990.

Of the four services, the U.S. Army was most affected in the early 1990's by the improvement in relations between the United States and the Soviet Union. In 1989, there were more than 200,000 U.S. Army troops based in what was then West Germany. After German reunification in October 1990, it was planned to considerably reduce this force. Numerous smaller U.S. bases through-

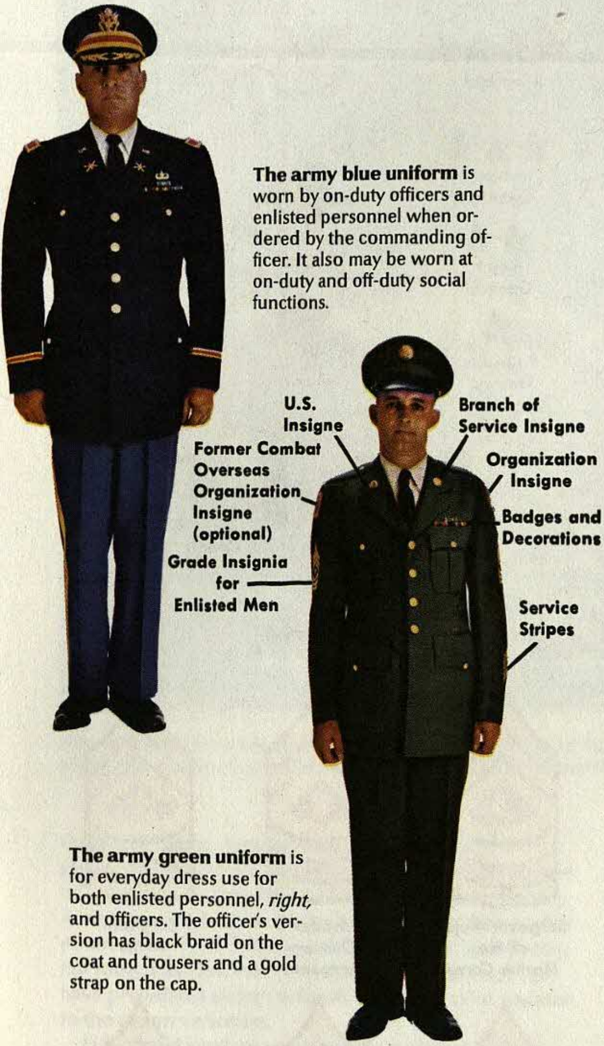
Marine Corps insignia of rank



Grade insignia for enlisted men



Uniforms of the United States Army


U.S. Insigne
Branch of Service Insigne
Former Combat Overseas Organization Insigne (optional)
Organization Insigne
Badges and Decorations
Grade Insignia for Enlisted Men
Service Stripes

The army blue uniform is worn by on-duty officers and enlisted personnel when ordered by the commanding officer. It also may be worn at on-duty and off-duty social functions.

The army green uniform is for everyday dress use for both enlisted personnel, *right,* and officers. The officer's version has black braid on the coat and trousers and a gold strap on the cap.

out the rest of Western Europe are being reduced in size, and will perhaps be closed if the situation in Europe remains stable.

The U.S. Air Force maintains bases throughout the world, and was therefore less affected by the rapid changes in European politics in the early 1990's. Through the Strategic Air Command, it is responsible for the Minuteman and Peacekeeper intercontinental ballistic missile (ICBM) launch sites, located in various parts of the United States.

Training

Officer training. Each of the U.S. armed services trains and commissions its own officers. Although most spend up to four years at a training academy, others gain their commissions through one of a number of graduate entry schemes.

The navy and the Marine Corps accept officers from the U.S. Naval Academy, from the Naval Reserve Officers Training Corps (NROTC), and from civilian universities. Some suitably qualified and senior serving noncommissioned officers are commissioned as officers. Naval officers may apply to join one of four divisions; line, staff, limited duty, and warrant. Line officers may command ships or aircraft, or they may specialize in technical fields such as engineering, meteorology, or public affairs. Staff officers include doctors, nurses, lawyers, chaplains, and others who usually undertake a shorter period of naval training. Warrant and limited duty officers are usually appointed from the enlisted ranks, and undertake administrative and technical duties.

Marine Corps officers undertake a minimum of five months' basic training at the Marine Corps Basic School at Quantico, Virginia. Much of this training is in field tactics, leadership, infantry skills, weapon handling, marksmanship, drill, and physical fitness.

Men and women wishing to become United States Army officers may either attend the U.S. Military Academy at West Point, New York, train with the Reserve Officers Training Corps (ROTC) at university, attend officer candidate school, or take one of the direct commissions open to members of certain professions such as medicine and law.

Officers may further their education by taking courses, some of which may be completed by correspondence. The best officers attend the U.S. Army Command and General Staff College at Fort Leavenworth, Kansas, or the Army War College at Carlisle Barracks, Pennsylvania.

Potential air force officers may graduate from the Air Force Academy, attend an Air Force Reserve Officers Training Corps (AFROTC) whilst at university, or enlist at an Officers Training School.

Training enlisted personnel. Applicants for the navy enlist initially for between four and six years. They must be aged between 17 and 31, and meet the navy's demanding physical standards. They receive basic training at *boot camp,* so-called because in the past recruits wore long leggings that looked like boots. Then they are either assigned to trade school to learn such specialist skills as catering and engineering, or are posted directly to a ship. Promotion through the ranks is by examination.

Qualified personnel may reach the rank of chief petty officer after 12 to 14 years, and may then apply for a commission. Enlisted women receive basic training at the naval training centre in Orlando, Florida, after which about half receive advanced training at specialist schools.

Marine Corps recruits must be between 17 and 28 years old in the case of men, and 18 and 28 in the case of women. They enlist for periods of three, four, or six years. Basic training comprises a testing ten-week course at either Parris Island, South Carolina; or San Diego, California. Recruits undergo physical conditioning and are taught marksmanship, drill, discipline, and the traditions of the marines. Women are trained at Parris Island, and undergo virtually the same training as men, except that they learn defensive rather than offensive tactics. Marines who reenlist may rise to the rank of senior noncommissioned officer. The best will attend the U.S. Naval Academy, receive direct commissions, or be appointed warrant officers.

Recruits to the army must be between 17 and 34 years old, and physically fit. They enlist for periods of two, three, or four years. After basic training, most male soldiers and all female soldiers attend specialist schools attached to the major bases. There they learn the special techniques of the branch of the army in which they will serve.

Air force trainees undertake a six-week introductory course. Then they specialize in one of over 40 career fields. As with the other services, promotion in the air force is by examination. The best men and women are eventually offered a commission.

Women in the armed services

Women have served in the U.S. armed services in every major conflict during the 1900's. Women's enlistment increased after 1973, when the conscription of male recruits ended after the withdrawal of U.S. forces from Vietnam, and U.S. armed forces became all-volunteer. In response to growing political pressure for the military to be seen as an equal-opportunities employer, the U.S. authorities have opened an increasing number of posts to women.

There are now about 230,000 women serving in uniform, approximately 11 per cent of the entire armed forces. Women make up 20 per cent of the U.S. Army Reserve, and 6 per cent of the U.S. Army National Guard. Although under the U.S. Constitution women are not allowed in combat, many serve in forward units and so would inevitably be involved in direct contact with an enemy in any conflict.

During World War II (1939-1945), women served in independent organizations within the main U.S. armed services. Navy women were known as WAVES (Women Accepted for Voluntary Emergency Service). Women in the army joined the Women's Army Auxiliary Corps (WAAC), later renamed the Women's Army Corps (WAC). The air force formed the Women Airforce Service Pilots (WASP's).

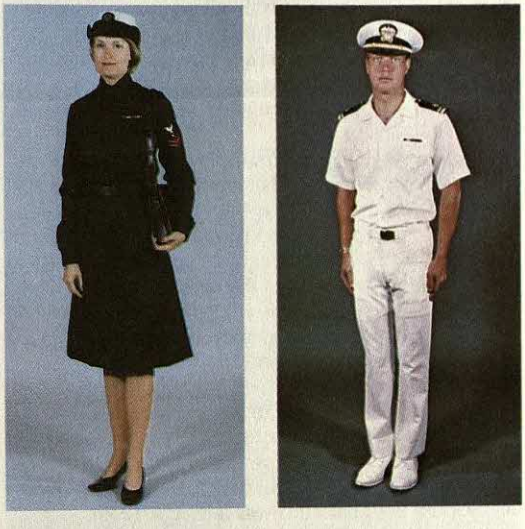
In 1948, women were authorized as equal members of both regular and reserve armed services. Today, women can reach the highest ranks in the services, receive the same pay as men, and, with the exception of taking part in actual combat, share the same duties and responsibilities.

Control of the U.S. armed services

The commander in chief of U.S. armed services is the president. Day-to-day control is delegated to the secretary for defence, who is answerable not only to the president but also to the United States Congress. The president appoints a civilian minister as secretary, or head, of each of the four services.

The Navy Department, located in Washington, D.C., is the central executive authority of the navy. It contains the offices of the secretary of the navy, together with those of the chief of naval operations, the commandant of the Marine Corps, and their respective staffs.

Army and air force headquarters are also in Washington. At army headquarters are the civilian secretary, and the military chief of staff who acts as his principal adviser. An army secretariat and staff form a series of subordinate agencies which provide the secretary with specialist advice through the chief of staff.



Uniforms of the U.S. Navy include various types of service dress blue uniforms and the summer white uniform, *right.*

At the Department of the Air Force, the air force secretary is assisted by the chief of staff. They are supported by an Air Staff. Members of this body include the chief scientist, comptroller, inspector general, judge advocate general, surgeon general, chief chaplain, and a scientific advisory board.

Command at sea and in the field

U.S. Navy. The navy is divided into two main sea commands. The Atlantic Fleet has headquarters at Norfolk, Virginia. The Pacific Fleet has headquarters at Pearl Harbor, Hawaii. These two commands are divided into *operational fleets.* Operational fleets are split into *task forces,* which are brought together for specific operational needs. Task forces are further divided into *task groups, task units,* and *task elements.*

Ships of the same type within each major fleet are further grouped into *type commands* for training and administrative needs. For example, all the submarines in the Atlantic Fleet are under one command for crew training purposes. Other commands include fleet marine forces, mine forces, naval air forces, surface forces, and training commands.

The Military Sealift Command is responsible for the transportation around the world of heavy equipment for the four services. It uses civilian-crewed ships and has its own supply and legal services.

Shore establishments and naval bases provide training facilities for navy crews. They also provide fuel and supplies to all warships within their operational area. Many bases include large repair yards, and a number have naval air stations attached.

U.S. Marine Corps. At any one time, more than two-thirds of all Marine Corps members are posted to operational duties, with the fleet marine forces, on board ships, or as embassy security guards. The fleet marine forces, attached to the Atlantic and Pacific fleets, consist of three marine divisions, three marine aircraft wings, and various support units. One division and air wing, known as an air-ground team, operates from the east coast of the United States. Another is on the west coast, and a third is in the Far East and Hawaii. The teams are kept combat-ready at all times, and are usually the first United States troops ashore in the case of an emergency.

Marines serving on board U.S. warships provide internal security. They can also form boarding and beach assault parties.

U.S. Army. From its headquarters at Fort McPherson, Georgia, the U.S. Army Forces Command is responsible for the combat readiness of the army's active and reserve forces throughout the United States, Puerto Rico, and the Virgin Islands. All mainland-based forces, including the Reserve and the Army National Guard, are controlled through five armies. These five armies—First, Second, Fourth, Fifth, and Sixth—are based in *army areas* across the United States.

The Seventh Army forms a major part of the U.S. Army, Europe, with headquarters at Heidelberg, Germany. Until the 1990's, this was the largest overseas command, with troops in half a dozen NATO countries. However, German reunification and the signing of the CTE (Conventional Troops in Europe) Treaty have led to a reduction in the requirement.

The U.S. Army, Pacific, commands all army units based in Hawaii, Alaska, Japan, and the Pacific. The Eighth U.S. Army in South Korea has its own headquarters in Seoul. The U.S. Army, South, directs units in Central and South America.

U.S. Special Forces, the Rangers, and a number of other specialized groups are controlled by the 1st Special Operations Command based at Fort Bragg, North Carolina. *Special Forces* personnel are organized into groups, each responsible for a specific region of the world. Group members learn the customs, languages, and cultures of their area. They provide expert training for friendly forces, undertake long-range reconnaissance, and organize antiterrorist activities. *Rangers* form three battalions of troops trained to make surprise raids behind enemy lines.

U.S. Air Force. The chain of command within the air force stems from the chief of staff and the vice chief of staff, and passes to the various operating agencies and major commands. The operating agencies provide accounting and finance support, auditing, engineering, information, news, and intelligence.

Strategic Air Command (SAC) provides the long-range missile, bomber, and reconnaissance force. The SAC commander reports directly to the joint chiefs of staff, under whose direct control SAC would fall in time of war. The *Tactical Air Command* (TAC) provides air support for the land and sea forces of the United States and its allies throughout the world. It provides tactical reconnaisance, fighter ground attack, and interceptor cover for the army. TAC is under the command of the local area commander.

Space Command is responsible for military satellite operations, missile warning systems, and space shuttle flights carrying military cargoes. *Support Commands* make sure that the air fleet has all of its logistical needs. *Training commands* provide well-trained personnel for the air force, and also the Air Force Reserve, and Air National Guard.

Reserve forces

Each of the four U.S. armed services has its own independent reserve, which may be mobilized in an emergency.

The Navy Reserve is divided into four categories. The Ready Reserve is fully trained, and its members are liable for immediate call-up. The Standby Reserve-Active has members who regularly train and often maintain standards with the aid of correspondence courses. Other reserves are the Standby Reserve-Inactive and the Retired Reserve.

The Marine Corps Reserve includes the Ready Reserve. Members enroll for six years, train for one weekend per month, and for two weeks each year. There is also a Marine Standby and Retired Reserve.

The army operates the Army Reserve. Members occasionally go on exercises and can expect to serve abroad in time of crisis. The Army National Guard is recruited in local areas. Members of the National Guard usually remain in their own state, and may be called out by the state governor to assist the civil powers in the event of disorder or a natural disaster. The National Guard can be brought under federal control by presidential decree, and has occasionally served abroad.

Air force. Many junior U.S. Air Force pilots are reservists, who undertake tours of duty ranging from four years to a full career. The Ready Reserve can be called to duty in any emergency. The Air Force Standby Reserve can only be called up in time of war.

Armaments

U.S. strategic nuclear forces are controlled jointly by the navy and air force. In the early 1990's, the navy had 36 ballistic nuclear submarines, armed with Trident and Poseidon missiles. The Trident has a range of about 6,400 kilometres. The Air Force Strategic Air Command (SAC) had 1,000 Minuteman and Peacekeeper intercontinental ballistic missiles (ICBM's). The ICBM's are deployed in six strategic missile wings, divided into 20 squadrons, each with five launch control centres. SAC also has about 390 active bomber aeroplanes, of which about 340 are long-range B-52's and B-1B's, and 56 are medium-range FB-111A's.

The U.S. Navy has reintroduced four 1940's vintage battleships. Each ship is armed with 16-inch (406-mm) guns which can fire shells more than 32 kilometres. The Navy relies on aircraft carriers for its main firepower. Battleships and aircraft carriers operate in *battle groups*, containing cruisers, specialist anticraft and antisubmarine destroyers, and frigates. Hunter-killer submarines, which can seek out and destroy enemy submarines, occasionally operate with a battle group. Such submarines offer an outer defensive shield but are most effective in deep water.

Naval aviation aircraft are designed to fly from the decks of aircraft carriers. U.S. naval aircraft include the A-6 Intruder and A-7 Corsair II attack aircraft, the F-14 Tomcat fighter, and the F/A-18 Hornet fighter and light-attack aircraft. Specialist aircraft, such as the P-3 Orion and S-3 Viking, carry electronic detection equipment, and work closely with helicopters to provide the fleet with antisubmarine defence.

Warships are armed with an array of guns ranging from the big guns of the battleships to 3-inch (75-mm) quick firing guns on the smaller frigates. Most ships also carry a variety of offensive and defensive missiles. These vary in size from the Tomahawk cruise and Harpoon surface-to-surface missiles to the much smaller Tartar and Terrier surface-to-air missiles. See **Guided missile.**

The U.S. Marine Corps is equipped with a combination of army and navy weapons. The aviation wing flies standard naval aircraft, together with the Harrier V/STOL (Vertical/Short Take-Off and Landing) fighter, and helicopters of all types.

Artillery and armoured support is provided by the marine infantry. Air-defence is supplied by Hawk guided missiles, and shoulder-fired Red-eye and Stinger missiles.

The U.S. Army has undertaken a huge reequipment programme, which has left it smaller in size but just as powerful. The main U.S. battle tank is the M1 Abrams. It is powered by an advanced turbine engine and is armed with a German-designed 120-mm tank gun. It is the fastest and probably the most powerful tank in the world (see **Tank**). The M-551 Sheridan, an air-portable reconnaissance assault vehicle, is in service with the airborne divisions.

Artillery is designed to neutralize enemy firepower, and provide support to the infantry and armour during ground attacks. It is becoming increasingly mechanized. Many of the larger guns, such as the 203-mm M-110 self-propelled howitzer, can fire nuclear shells. The artillery is being equipped with multi-barrelled launchers capable of firing target-seeking rockets over long distances. See **Artillery.**

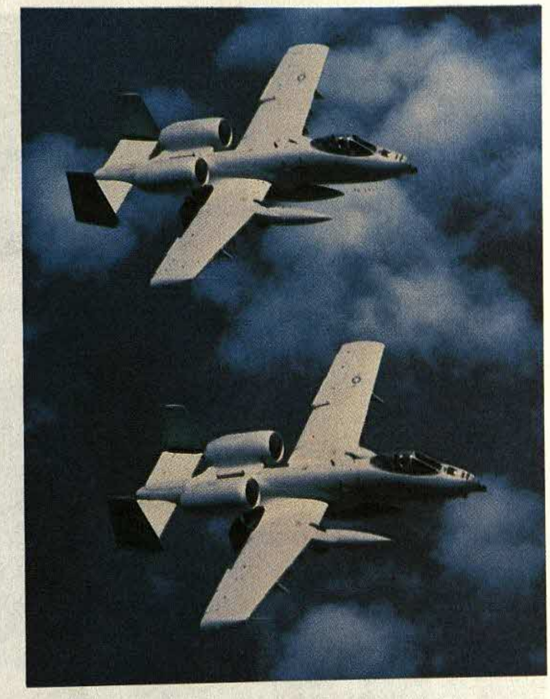
Most mechanized infantry units are equipped with the Bradley MICV (Mechanized Infantry Combat Vehicle). The Bradley is armed with an electrically operated 25-mm "chain gun", a machine-gun, and two anti-tank guided missiles. The crew compartment at the rear can hold six fully equipped infantrymen. The infantrymen are armed with M-16A2 rifles, machine guns, mortars, grenades, and light antitank weapons (LAW's).

The army has a huge logistics organization, which includes communications and transportation units, engineers, and medical personnel (see **Logistics**). It has its own aviation wing which provides local reconnaissance and transportation of units in and around the front line.

The U.S. Air Force has many kinds of aircraft, the vast majority of them jets. Planes are classified by numbers and letters. The letters define the type of plane, the numbers designate the model. Where more than one letter is used, the first shows the current modification, and the second the basic design. Thus an F-111 would be the standard fighter plane, an FB-111 would be a bomber version, and an EF-111 an electronic-countermeasure version of the same basic aeroplane.

Bombers drop explosives on enemy targets. These may take the form of *iron bombs,* which are dropped directly onto the target, or *stand-off bombs,* which are released some distance from the target and then directed by radar, either from the aircraft or from the ground. See **Bomber.**

Fighters are divided into two main types. *Interceptors* or *air-superiority fighters* fly extremely fast, often in excess of Mach 2 (twice the speed of sound), and are highly manoeuvrable. Most are single-seat, and are armed with air-to-air guided missiles, such as Sidewinder, to attack enemy aircraft. *Fighter-ground attack* aircraft are heavier and slower. They carry a mixture of guns, missiles, and bombs to attack enemy positions on the ground.



A-10 Thunderbolt attack planes provide low-flying air support for ground troops, especially against armoured targets.

Attack planes are low-flying aircraft used to support ground troops. The A-10 Thunderbolt is an attack plane designed specifically to fly slowly and at low level to attack enemy tanks. It is extremely heavily armoured to give the pilot maximum protection, and its twin rear-mounted engines can take tremendous punishment without failing.

Other U.S. Air Force aircraft include reconnaissance, transport, and tanker types. Reconnaissance aircraft use advanced cameras and SLAR (Sideways Looking Airborne Radar) systems to observe enemy forces and installations. Until its withdrawal in 1990, the SR-71 Blackbird reconnaissance jet was the fastest aircraft in service, flying at Mach 3. The latest and most secret U.S. military aircraft are the F-117 stealth fighter, and the B2 stealth bomber, which use a streamlined shape and special materials to escape detection by enemy radar (see **Radar**).

Related articles in ***World Book*** include:

Airborne troops
Air force
American Civil War
Amphibious warfare
Army
Aviation
Decorations, medals, and orders
Korean War
Logistics
Marine
Navy
Persian Gulf War
Spanish-American War
Vietnam War
War of 1812
Warship
World War I
World War II

The Declaration of Independence and the United States Constitution provide the basis of the U.S. government. These documents are displayed in the National Archives Building in Washington, D.C. The Declaration stands in an upright case above the Constitution.

Government of the United States

United States, Government of the. The government of the United States represents, serves, and protects the American people at home and in foreign countries. From the nation's capital in Washington, D.C., the U.S. government's activities and influence reach every part of the world.

The three branches of the United States government—executive, legislative, and judicial—are usually represented by the president, Congress, and the Supreme Court. Generally speaking, the president enforces the laws that Congress passes, and the Supreme Court interprets these laws if any question arises.

United States military forces stationed in many parts of the world support American policy and help preserve peace. Representatives of the government work in international organizations, provide technical assistance, and negotiate with other governments. Millions of civil service employees and other workers at home and abroad carry out the programmes of the government.

The United States government shares governmental powers with the states under the *federal* system established by the United States Constitution. The national governments of most other countries are *unitary* (centralized). They have final authority in all matters, and grant only limited powers to state and local governments.

Government in the United States operates on three levels: national, state, and local. The federal government in Washington cannot abolish the states or rearrange their boundaries. It can exercise only powers that are delegated or implied by the Constitution. The states exercise powers reserved to them or not denied them by the Constitution. In some areas, the federal and state governments have *concurrent* powers. That is, they both have the right to exercise authority. The American judicial system keeps the federal and state governments within their proper fields of power.

The United States government makes and enforces laws, collects taxes, provides services for the people, protects individuals and their property, and works for national and international security. But it is noted for the way it encourages the people to take part in government, seeks to protect the rights of the people from the government itself, and assures the self-government of the states.

The executive branch

The executive branch of the United States government consists of (1) the Executive Office of the president, (2) the executive departments, and (3) the independent agencies.

The president of the United States is the nation's chief executive and chief of state. The president lives in the White House in Washington, D.C., and has offices there.

As chief executive, the president has the responsibilities of enforcing federal laws and appointing and removing high federal officials. The president commands the armed forces, conducts foreign affairs, and recommends laws to Congress. The president also appoints American representatives to international organizations and to diplomatic missions in other lands. As chief of state, the president performs many ceremonial duties. Elected by the people to hold office for a four-year term, the president cannot be elected to more than two terms.

The Executive Office of the president includes: (1) the White House Office, (2) the Office of Management and Budget, (3) the National Security Council, (4) the Office of Policy Development, (5) the Council of Economic Advisers, (6) the Office of the United States Trade Representative, (7) the Office of Administration, (8) the Council on Environmental Quality, (9) the Office of the Vice President, (10) the Office of Science and Technology Policy, (11) the National Critical Materials Council, and (12) the Office of National Drug Control Policy. See **President of the United States.**

Executive departments conduct the administration of the national government. These 14 departments are: (1) State, (2) Treasury, (3) Defense, (4) Justice, (5) Interior, (6) Agriculture, (7) Commerce, (8) Labor, (9) Health and Human Services, (10) Housing and Urban Development, (11) Transportation, (12) Energy, (13) Education, and (14) Veterans Affairs. Department heads are appointed by the president, with the approval of the Senate. They form the *Cabinet* (see **Cabinet**). Thirteen are called *secretaries.* The attorney general heads the Department of Justice. Most officials below the highest level serve under civil service appointments (see **Civil service**).

Independent agencies developed with the growth of government regulation. These agencies operate in many fields, including aeronautics and space, banking and finance, civil rights, communications, labour relations, nuclear energy, science, small business, and transportation safety. The president appoints the members of these agencies with Senate approval, and must state reasons for removing them.

The legislative branch

The legislative branch of the United States government includes Congress, which consists of the Senate and the House of Representatives. This branch also includes eight administrative agencies: (1) the Architect of the Capitol, (2) the Congressional Budget Office, (3) the Copyright Royalty Tribunal, (4) the General Accounting Office, (5) the Government Printing Office, (6) the Library of Congress, (7) the Office of Technology Assessment, and (8) the United States Botanic Garden.

Congress makes, repeals, and amends federal laws. It also levies federal taxes and appropriates funds for the government. See **Congress of the United States.**

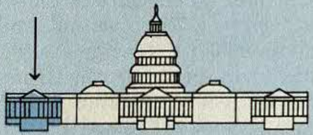
Symbols of the United States include the American flag and the Great Seal. The eagle holds an olive branch and arrows, symbolizing a desire for peace but the ability to wage war. The reverse side bears the Eye of Providence, representing God, and a pyramid dated 1776.

The United States Capitol in Washington, D.C., is where Congress meets to make laws. The House of Representatives uses the wing on the left, and the Senate the one on the right.

How a bill becomes law in the United States

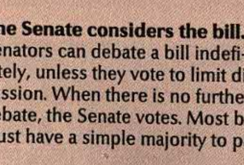
The drawings on this page and the next show the normal path of a bill introduced in the House of Representatives. The process is the same for a bill introduced in the Senate, except that the House action comes after the Senate action. A bill may originate in either house of Congress unless it deals with taxes or spending—all such bills must be introduced in the House.

Introduction in the House. A bill must be sponsored by a member of the House. The sponsor introduces a bill by giving it to the clerk of the House or placing it in a box called the *hopper.* The clerk reads the title of the bill into the *Congressional Record* in a procedure called the *first reading.* The Government Printing Office prints the bill and distributes copies.



Assignment to committee. The speaker of the House assigns the bill to a committee for study. The House has about 20 *standing* (permanent) committees, each with jurisdiction over bills in a certain area.

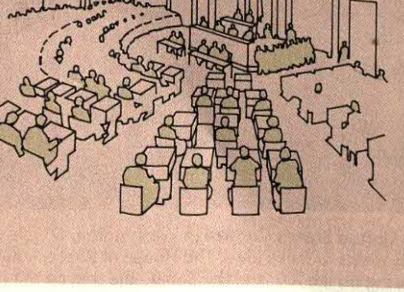
The bill goes to the Senate to await its turn. Bills normally reach the Senate floor in the order that they come from committee. But if a bill is urgent, the leaders of the majority party might push it ahead.



Committee action. The committee or one of its subcommittees studies the bill and may hold hearings. The committee may approve the bill as it stands, revise the bill, or table it.

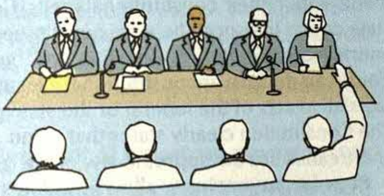
Assignment to committee. The vice president of the United States, who is the presiding officer of the Senate, assigns the proposed law to a committee for study. The Senate has about 15 standing committees.

The Senate considers the bill. Senators can debate a bill indefinitely, unless they vote to limit discussion. When there is no further debate, the Senate votes. Most bills must have a simple majority to pass.



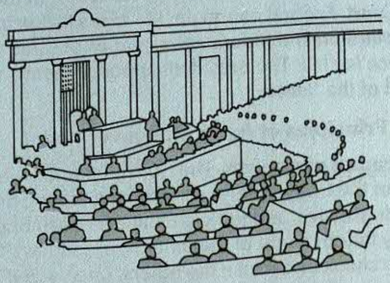
A conference committee made up of members of both houses works out any differences between the House and Senate versions of the bill. The revised bill is sent back to both houses for their final approval.

The committee studies the bill and hears testimony from experts and other interested persons. In some cases, a subcommittee conducts the study. The committee may release the bill with a recommendation to pass it, revise the bill and release it, or lay it aside so that the House cannot vote on it. Releasing the bill is called *reporting it out,* and laying it aside is called *tabling.*

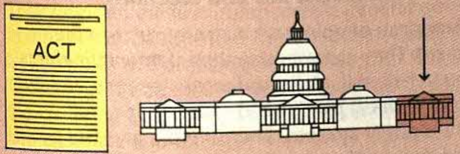


The bill goes on a calendar, a list of bills awaiting action. The Rules Committee may call for quick action on the bill, limit debate, and limit or prohibit amendments. Otherwise, a bill might never reach the House floor.

Consideration by the House begins with a second reading of the bill, the only complete reading in most cases. A third reading, by title only, comes after any amendments have been added. If the bill passes by a *simple majority* (one more than half the votes), it goes to the Senate.

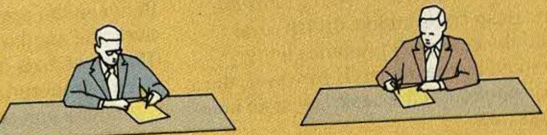


Introduction in the Senate. To introduce a bill, a senator must be recognized by the presiding officer and announce the introduction of the bill. A bill that has passed either house of Congress is sometimes called an *act,* but the term usually means legislation that has passed both houses and become law.



The bill is printed by the Government Printing Office in a process called *enrolling.* The clerk of the house of Congress that originated the bill certifies the final version.

The speaker of the House signs the enrolled bill, and then the vice president signs it. Finally, Congress sends the proposed new legislation to the president for consideration. The president has 10 days to sign or veto the bill. The president may also let a bill become law by allowing 10 days to pass without acting.



The Senate has 100 members. Each state, regardless of size or population, has two senators, who serve six-year terms. The vice president of the United States presides over the Senate. The Senate has certain exclusive powers. It alone can sit as a court of impeachment to try federal officials impeached by the House of Representatives. It alone has the power to approve the president's nominations for major federal offices. Any treaty made by the United States is subject to the Senate's approval.

The House of Representatives consists of 435 members. A state's representation is based on population. It ranges from California's 52 members to one each from Alaska, Delaware, Montana, North Dakota, South Dakota, Vermont, and Wyoming. The number of representatives changes as population changes. Only the House can bring charges of impeachment against high federal officials. It alone can initiate tax bills.

The judicial branch

The Supreme Court of the United States is the highest court in the land. It has a chief justice and eight associate justices. The president appoints all justices with the approval of the Senate. The justices hold office for life.

Other federal courts. About 95 federal *district courts* are located in various cities. Above the district courts are 13 federal *courts of appeals,* often called *circuit courts.* Above the courts of appeals is the Supreme Court. Decisions of a district court may be appealed to an appeals court, and from the appeals court to the Supreme Court. Federal courts decide cases that involve the Constitution and federal laws. Judges of these courts hold office for life. The president appoints them with the approval of the Senate.

Principles of American government

Separation of powers. The Constitution divides the powers of the United States government among the executive, legislative, and judicial branches. Each branch is generally independent of the other two, and has the authority to check or balance the others. *Checks and balances* give each branch some powers that affect the other two. For example, Congress holds a check over the president with its authority to make government appropriations. It checks the courts with its powers to organize courts and create rules for their procedures. One of the president's checks on Congress is the power to veto bills. The president influences the courts by the kind of judges he or she appoints. The courts can check the president and Congress by declaring executive orders and legislative acts unconstitutional.

A written constitution provides the basis of government in the United States. The Constitution divides powers and duties between the federal and state governments. In addition, it specifies the powers of each branch of the national government. A written constitution is a unique American contribution. British royal governors had ruled the colonies in America under written charters granted by the monarch. However, the idea of a written constitution as the basic law of an independent country was new.

The Constitution not only grants powers, but also limits them. However, it does not answer all questions. For example, who in the government is to say that a state is trying to use a power that belongs to the federal government? Who is to say that the federal government is attempting to exercise a power that belongs to the states? Who is to say that the president, Congress, or the Supreme Court are acting unconstitutionally?

Judicial review is the method used to answer the basic question: Who is to say what the Constitution means in cases of dispute? Courts have the power to declare legislative acts and executive orders (1) constitutional, or legal; or (2) unconstitutional, or illegal.

Judicial review confines the state and national governments within their constitutional limits. Generally, the state courts interpret the state constitutions, and federal courts interpret the U.S. Constitution. The Supreme Court can declare unconstitutional executive orders and legislative acts of the federal or the state governments. The Constitution clearly states that it and all federal laws and treaties are the supreme law of the land.

Popular sovereignty allows the American people to change the Constitution. Congress initiates amendments to the Constitution. A proposed amendment must have the approval of two-thirds of both the Senate and the House of Representatives. It then goes to the states for their approval. Congress may call a national convention to propose amendments, if two-thirds of the state legislatures request it. The amendment becomes a part of the Constitution after legislatures or conventions in three-fourths of the states have ratified it. The American people may adopt an entirely new constitution by calling a new constitutional convention. If such a convention were held, the constitution it adopted would be sent to the states for approval. It would become effective when ratified in the same way as an amendment.

Political parties and elections

The American people have a strong voice in their government. They can exercise their democratic rights by voting in national, state, and local elections, and by working in political parties and campaigns.

The two-party system. The United States has two major political parties, the Democratic and the Republican. Members of these two parties hold almost all the offices in the national, state, and local governments.

Minor political parties of the United States rarely elect candidates to government offices. They serve chiefly to call attention to problems that the major parties may have neglected. Often, one or both of the major parties may then attempt to solve such a problem. Then the third party, which brought attention to the problem, may disappear.

National elections to elect a president and vice president are held every four years on the first Tuesday after the first Monday in November. All members of the House of Representatives and about one-third of the members of the Senate are elected at this same time. Between the presidential elections, all of the representatives and another one-third of the senators are elected. This election is held on the same day in November in even-numbered years.

Federal and state laws regulate elections and the qualifications of voters. Most states hold *primary* elections in which party members nominate candidates for state and local offices. Some states use primary elections to nominate candidates for Congress. National political conventions nominate candidates for president and vice president. See **Political convention; Primary election.**

The president is not elected directly by the people. At presidential elections, voters cast their votes for *electors.* The electors make up the Electoral College, which officially elects the president (see **Electoral College**). Each state has as many electors as the total of its senators and representatives in Congress. The District of Columbia has three electors. The candidate who receives the highest number of a state's popular votes usually receives all that state's electoral votes. A candidate for president must receive a majority of the electoral votes to become president; however, a candidate may be elected president without having received a majority of the popular vote.

The development of American government

English background. The United States inherited many government practices from the English rulers of colonial days. In England, the people, particularly in the middle classes, had fought their kings to win the right to representative government. They had also won civil rights and liberties that would protect them and their property from arbitrary acts of government.

The English colonists brought with them the ideas of representative government and civil liberties when they came to America. American frontier life produced much individual independence and self-reliance because of the equal opportunity offered each person. Representative government and many civil liberties became even broader than they had been in Great Britain.

Early American government. The colonies became states after the Declaration of Independence in 1776. They founded the first independent general government in the United States under the *Articles of Confederation* (see **Articles of Confederation**). Under the Articles, the 13 states guarded their individual powers so strictly that they failed to give Congress the power to tax or to regulate interstate and foreign commerce. Congress could not even create an army without asking the state governments for men and money. Such leaders as George Washington and Benjamin Franklin feared that the weak national government would collapse. This concern led to the Constitutional Convention of 1787 in Philadelphia. There, the delegates wrote the Constitution of the United States. The document went into effect on June 21, 1788.

The Constitution gave the national government more powers than it had possessed under the Articles of Confederation. The federal government exercises these powers directly over the people, not through the state governments, as it had done under the Articles.

Problems of government. Since 1789, all governments—national, state, and local—have taken on more powers and duties. They have been forced to do so by the increase in population, the growth of cities and towns, the development of industries, and the growth of transportation and communications. Problems that were once local, such as conservation and transportation, have become national. The belief has developed that people should use government and other organizations to provide themselves with services, such as social security, made possible by modern wealth and science. As a result, the federal government has grown even faster than the state and local governments.

Many people object to the expansion of federal authority, particularly over state and local matters. Others insist that public interest demands federal control in cases that involve more than one state. When conflicts arise, the courts must decide how to balance states' rights with the needs of the nation.

Related articles in *World Book* include:

Ballot
Bill of rights
Census
Citizenship
Civil service
Congress of the United States
Constitution
County
Court
Democracy
E pluribus unum
Electoral College
Flag
Foreign Service
Government
House of Representatives
Immigration
Law
Liberty Bell
Library of Congress
Local government
Money
National Aeronautics and Space Administration
National debt
Pledge of Allegiance
Political parties
President of the United States
Radio Free Europe/Radio Liberty
Senate
Star-Spangled Banner
State, Department of
Statue of Liberty
Tariff
Taxation
Territory
Uncle Sam
United States, History of the
Veto
Voting
Washington, D.C.
White House
Yankee

Outline

I. The executive branch
- A. The president
- B. Executive departments
- C. Independent agencies

II. The legislative branch
- A. The Senate
- B. The House of Representatives

III. The judicial branch
- A. The Supreme Court
- B. Other federal courts

IV. Principles of American government
- A. Separation of powers
- B. A written constitution
- C. Judicial review
- D. Popular sovereignty

V. Political parties and elections
- A. The two-party system
- B. National elections

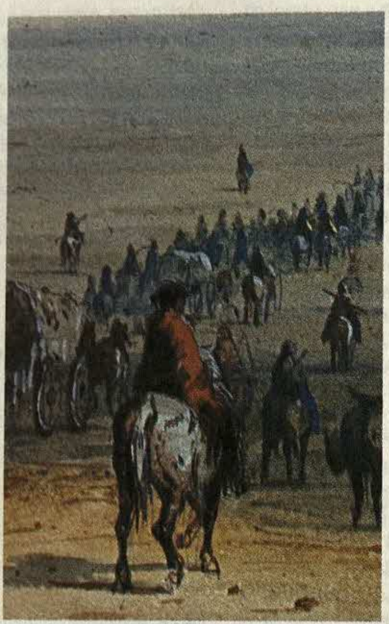
VI. The development of American government
- A. English background
- B. Early American government
- C. Problems of government

Questions

How does the United States government differ from most other national governments?
What are the three branches of the United States government?
What is *popular sovereignty*? *Judicial review*? Why are they important in the United States government?
How does each branch of the government exercise its powers of checks and balances?
How does the United States Constitution divide powers among the national and state governments?
What is an *independent agency*? What does it do?
How did the ideas of representative government develop in the colonies?
What steps must be taken to amend the United States Constitution?
What are two exclusive powers of the House of Representatives?
What are some typical questions of government left unanswered by the United States Constitution?

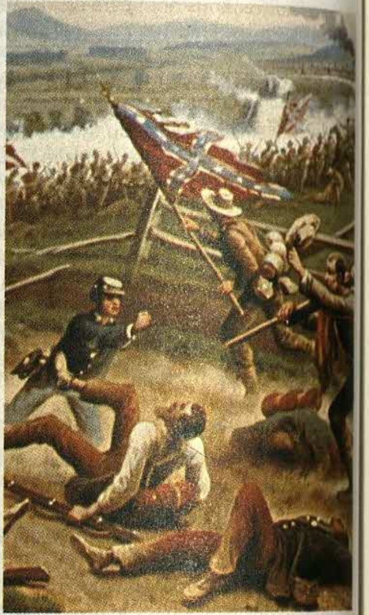
Kennedy Galleries, Inc., New York City

Independence



Walters Art Gallery, Baltimore, Maryland

The westward movement



West Point Museum, New York

The American Civil War

The history of the United States spans more than 200 years. It is an exciting tale of the birth and growth of one of the world's freest, richest, and most powerful nations.

History of the United States

United States, History of the. The history of the United States is the story of a great nation that was carved out of a wilderness by a brave and freedom-loving people. The men and women who built the United States came from almost every part of the world. They represented many different nationalities and religions. Through the years, the people and their descendants learned to live and work together, and to take pride in being Americans. This spirit of cooperation and pride helped make the United States the huge, powerful, and wealthy nation it is today. It also helped the country and its people survive many challenges and hardships—including dangers in the wilderness, wars, social turmoil, and economic depressions.

Background

As late as the 1400's, Indians and Eskimos were the only inhabitants of the Western Hemisphere. During the next 200 years, people from several European countries sailed across the Atlantic Ocean to North and South America. Among them were colonists—chiefly British—who settled along the eastern coast of North America between what are now Maine and Georgia. These colonists built up a series of thriving settlements. They lived under British rule for many years. But their dedication to liberty led them to declare their independence and form the United States of America in 1776.

Growth and expansion

The American people dedicated their new nation to the principles of democracy, freedom, equality, and opportunity for all. From the start, the United States welcomed immigrants to its shores. Attracted by the opportunity for freedom and a chance for a better life, newcomers from many lands poured into the United States by the millions. Immigration and natural growth caused the nation's population to mount steadily—from fewer than 3 million people in 1776 to more than 250 million people today.

As the population grew, the American people spread out across North America. Wherever they went, these pioneers worked hard to turn the wilderness into a place where they could earn a living. They formed thriving farms in places where the soil was good. They searched for minerals and other valuable resources, and established towns where they found resources. Cities grew up along the main transportation routes and business and industry prospered there. America's rapid growth made it one of the largest nations in the world in terms of both size and population. The country's bustling economic activity turned it into a land of enormous wealth.

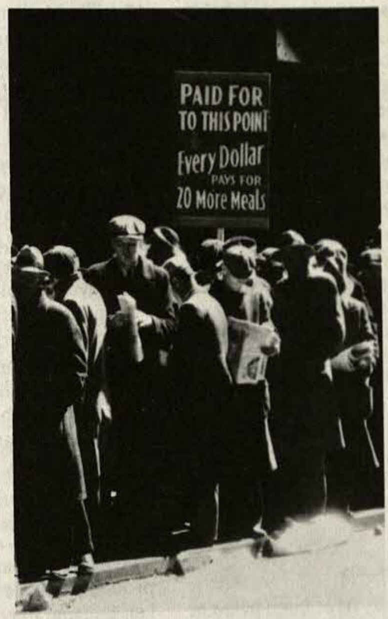
Today, the United States ranks as the world's leading producer of farm products and manufactured goods, and its people have one of the the highest standards of living in the world. The United States also became a world leader in many other fields, including science, medicine, technology, and military strength.

Challenges and hardships

The United States grew and prospered in spite of many challenges and hardships. At the start, the very

The Metropolitan Museum of Art, New York City

Industrialization



The Great Depression

The space age

survival of the new nation was in doubt. The colonists who founded the United States had to defeat the mighty British Empire in the American Revolution to establish their claim to independence. They succeeded despite great odds against them.

Both the colonists and the pioneers who moved westward across the country faced many dangers, including disease, starvation, and attacks by Indians. In the 1860's—less than 100 years after the American Revolution—the survival of the United States was threatened once again. Eleven Southern states withdrew from the Union and tried to establish an independent nation. The tragic, bloody American Civil War between the North and the South followed. The North won the war and the country remained united.

The American ideals of equality and opportunity for all did much to help the United States grow and prosper. Yet the ideals have not always been followed in practice. From colonial times until the end of the American Civil War, many black Americans were slaves. In addition, some Americans have suffered from discrimination in employment and other areas because they were immigrants, or because of their race or religion.

America's economic growth, though amazingly rapid, has not always been smooth. Periodically, severe depressions have brought the economy to a near standstill. At such times, large numbers of Americans lost their jobs and lived in poverty.

During the 1900's, the United States became one of the strongest military powers in the world. As such, it took on the role of defending democracy throughout the world. This role led the United States into two world wars and into other conflicts. During the mid-1900's, many Americans began protesting against their country's military role, while others defended it. The question of what that role should be led to bitter disputes among the people.

Today, as always, the United States faces many problems. They include the existence of poverty amid great wealth, recurring slumps in the economy, disputes over foreign policy, and pollution of the environment. But Americans retain deep pride in their country and the belief and hope that they can overcome their difficulties as their ancestors did.

About this article

The article traces the history of the United States from its beginnings to the present day. The outline below shows the major sections of the article. World Book *also has many individual articles on important events and people in United States history. Cross-references within this article refer to other* World Book *articles for details on key topics. The Study aids section includes a listing of related articles.*

Article outline:

I. America before colonial times
II. The colonial heritage (1607-1753)
III. The movement for independence (1754-1783)
IV. Forming a new nation (1784-1819)
V. Expansion (1820-1849)
VI. The irrepressible conflict (1850-1869)
VII. Industrialization and reform (1870-1916)
VIII. A new place in the world (1917-1929)
IX. Depression and a world in conflict (1930-1959)
X. America since 1960
XI. Study aids

For thousands of years, Indians were the only inhabitants of the Western Hemisphere. They had wandered into North America from Asia about 15,000 years ago. They spread across the hemisphere to the tip of South America. Probably about 6,000 years ago, Eskimos—another Asian people—moved to the Western Hemisphere. They soon spread eastward across the Arctic part of North America. They remained only in the far north, near the Arctic Circle (see **Eskimo**).

The Vikings were probably the first white people to reach America. A band of these venturesome seafarers is believed to have explored part of the east coast of North America about 1,000 years ago. However, the exploration and settlement of America by Europeans did not begin for another 500 years. Then, in 1492, Christopher Columbus sailed westward from Spain, seeking a short sea route to the Orient. He found, instead, a vast New World. Following Columbus' voyage, explorers, soldiers, and settlers from several European countries flocked to America. The process through which white people would take control of the Indian homeland was underway.

The first Americans

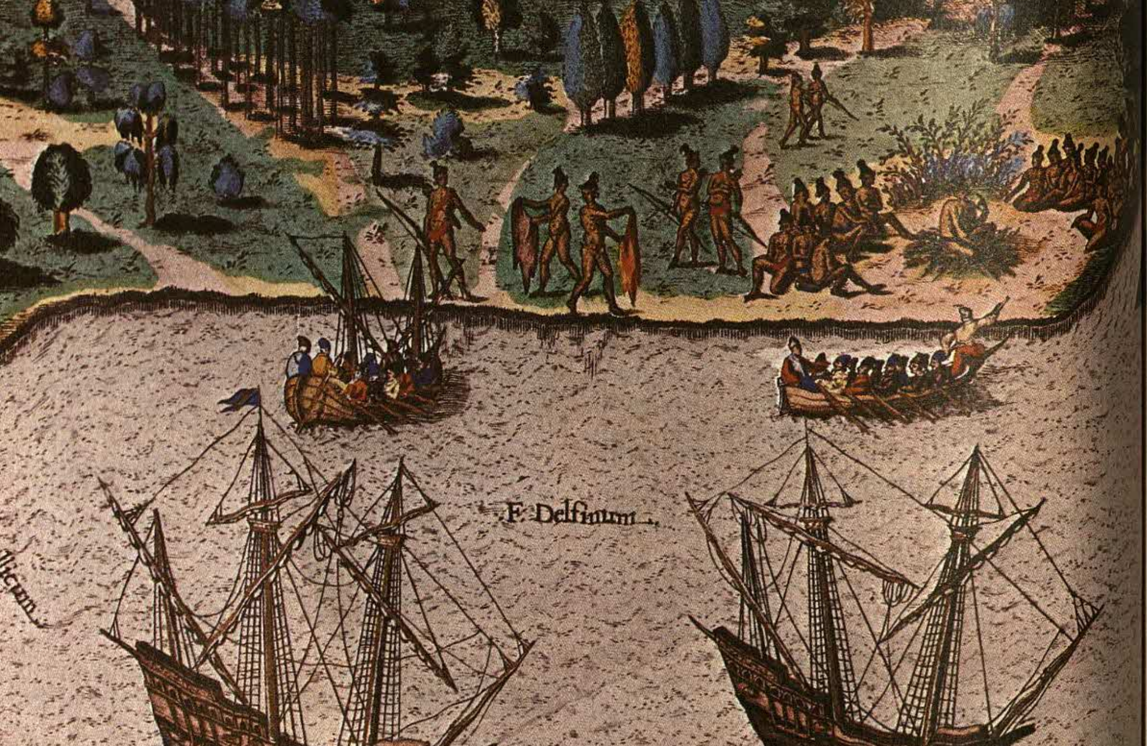
As many as 80 million Indians may have been living in the Americas when Columbus reached the New World. As many as 65 million Indians lived between what is now Mexico and the tip of South America. As many as 15 million Indians lived in what are now the United States and Canada.

The American Indians formed hundreds of tribes, with many different languages and ways of life. Some tribes in Central and South America—including the Aztec, Inca, and Maya—established advanced civilizations. They founded magnificent cities and accumulated gold, jewels, and other riches. Most American Indians north of Mexico lived in small villages. They hunted game and grew such crops as maize, beans, and gourds. Some tribes travelled continuously in search of food and never established permanent settlements.

Some Indian tribes of North America helped the early European settlers survive in the wilderness of the New World. But as the settlers pushed steadily westward, they became a threat to the Indian way of life, and Indians and whites became enemies. For a detailed story of the first Americans, see the *World Book* article on **Indian, American.**

European discovery

The Vikings. About A.D. 1000, Vikings from Greenland explored part of the North American mainland—probably what is now Newfoundland, Canada. Led by Leif Ericson, they were probably the first white people to reach the mainland of the continent. But the Vikings did not establish permanent settlements, and their voyages were soon forgotten.



European explorers from several countries made voyages to America during the 1500's. The scene below shows French explorer Jean Ribaut and his crew approaching the Florida coast in 1562. Friendly Indians gathered along the shore to greet the newcomers.

The French Arrive in Florida (1591), an engraving by Theodore de Bry based on a painting by Jacques le Moyne; Library of Congress, Washington, D.C.

Columbus. Before Columbus' voyage, Europeans did not know the Western Hemisphere existed. During the 1400's, Europeans became interested in finding a short sea route to the Far East—a region of spices and other valuable goods.

Columbus, an Italian navigator, believed he could find a short route to the East by sailing west. Financed by the Spanish king and queen, he set sail westward from Spain on Aug. 3, 1492. Columbus reached land on October 12, and assumed he had arrived in the Far East. Actually, he landed on San Salvador, one of the islands just east of the North American mainland.

Before he died in 1506, Columbus made three more voyages to the Western Hemisphere. He came to believe he had discovered a vast, unknown continent which he called an "Other World." Other Europeans called this unexplored area the *New World* and honoured Columbus as its discoverer. Europeans also called the Western Hemisphere *America,* after Amerigo Vespucci. An Italian, Vespucci claimed he made voyages to the New World for Spain and Portugal beginning in 1497.

Exploration and early settlement

The discovery of the existence of America caused a wave of excitement in Europe. To many Europeans, the New World offered opportunities for wealth, power, and adventure. European rulers and merchants wanted to gain control of the hemisphere's resources in order to add to their wealth. Rulers also sought to gain New World territory, and thus increase their power. Christian clergymen were eager to spread their religion to the Indians. Explorers and others viewed the New World as a place to seek adventure, as well as gain personal fame and fortune. Before long, Europeans from several countries sailed across the Atlantic to explore America and set up trading posts and colonies.

For details on the early exploration, see **Exploration.**

The Spanish and Portuguese. During the 1500's, the Spanish and Portuguese spread out over the southern part of the Western Hemisphere in search of gold and other riches. The Spaniards quickly conquered the Inca of Peru, the Maya of Central America, and the Aztec of Mexico. The Portuguese took control of what is now Brazil. By 1600, Spain and Portugal controlled most of the hemisphere from Mexico southward.

Also during the 1500's, Spaniards moved into what is now the Southeastern and Western United States. They did not discover riches there, as they did farther south. But they took control of Florida and of the land west of the Mississippi River. In 1565, the Spanish founded St. Augustine, Florida, the oldest permanent settlement by Europeans in what is now the United States. They also established missions and other settlements in the West and South. See **Spain** (The Spanish Empire).

The English and French began exploring eastern North America in about 1500. At first, both nations sent only explorers and fur traders to the New World. But after 1600, they began establishing permanent settlements there. The French settlements were chiefly in what is now Canada. The English settlements included the 13 colonies that later became the United States.

For many years, Britain and France struggled for control of the land between the Atlantic Ocean and the Mississippi River, and for Canada. Britain finally won the struggle in 1763 when it defeated France in the Seven Years' War.

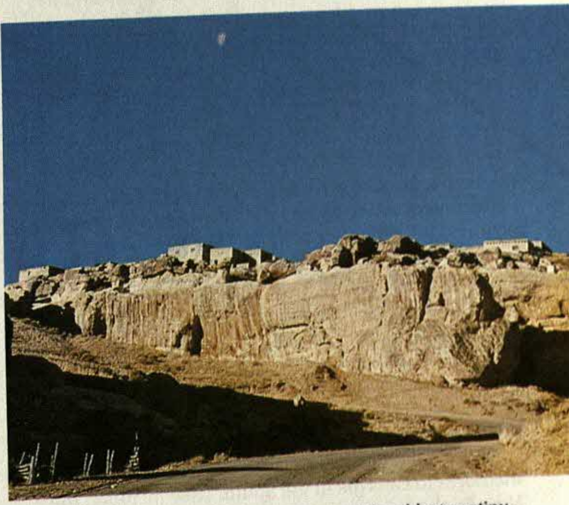
The land that became the United States

The explorers who came to the northern part of the hemisphere did not find gold and other riches, as did the Spanish in the south. Nor did these explorers find large Indian civilizations to help supply their needs. Instead, they found a wilderness sparsely inhabited by Indians.

The first settlers encountered many hardships as they attempted to establish colonies along the eastern coast. They had no way of knowing that beyond their settlements lay a vast and unbelievably rich and varied land. But later, the resources of this new land—its fertile soils, abundant water supplies, and plentiful minerals—would help the United States grow into one of the world's largest and most prosperous nations.

Important dates

1492	Christopher Columbus sailed from Spain to the Western Hemisphere. Europeans honoured him as the discoverer of America.
1497	John Cabot made the first voyage to North America for England.
1500	Portuguese explorer Pedro Álvares Cabral reached what is now Brazil.
1513	Ponce de León of Spain began exploring Florida, seeking the Fountain of Youth.
1521	Spanish conquistador Hernando Cortés defeated the Aztec of Mexico.
1534	Jacques Cartier of France became the first European to reach the Gulf of St. Lawrence in Canada.
1540-1542	Francisco Coronado of Spain explored the American Southwest.
1565	Spaniards founded St. Augustine, Florida, the first permanent European settlement in what is now the U.S.
1585	Sir Walter Raleigh tried unsuccessfully to establish a permanent British settlement in America.



An Acoma Indian village, *above,* is one of the oldest continuously inhabited settlements in the U.S. Located on a *mesa* (flat-topped hill) in New Mexico, it probably dates from the 1300's.

Library of Congress, Washington, D.C.

New York Public Library

The industrious colonists worked hard to establish communities in the wilderness. A Northern colonist, *left,* shaves a board to size for a house he is building. Slaves on a Southern plantation, *right,* pack tobacco for shipment to Europe as plantation owners look on.

The colonial heritage

The first English attempt to establish a colony in what is now the United States took place in 1585. Sir Walter Raleigh sent settlers to Roanoke Island, off the coast of North Carolina. But this attempt at colonization failed (see **Lost Colony**).

In 1607, a small band of about 100 English colonists reached the coast near Chesapeake Bay. They founded Jamestown, the first permanent English settlement in North America (see **Jamestown**). During the next 150 years, a steady stream of colonists went to America and settled near the coast.

The earliest colonists faced great hardship and danger. They suffered from lack of food and from disease, and they were sometimes attacked by Indians. But the colonists soon established productive farms and plantations; built towns, roads, churches, and schools; and began many small industries.

The American colonists also developed political practices and social beliefs that have had a major influence on the history of the United States. They made strides toward democratic government, and they placed a high value on individual freedom and on hard work.

The thirteen colonies

In the early 1600's, the English king began granting charters for the purpose of establishing colonies in America. By the mid-1700's, most of the settlements had been formed into 13 British colonies. Each colony had a governor and legislature, but each was under the ultimate control of the British government.

The 13 colonies stretched from what is now Maine in the north to Georgia in the south. They included the New England Colonies of Massachusetts, Connecticut, Rhode Island, and New Hampshire in the far north; the Middle Colonies of New York, New Jersey, Pennsylvania, and Delaware; Virginia and Maryland along Chesapeake Bay; and the Southern Colonies of North Carolina, South Carolina, and Georgia in the far south.

Virginia and Maryland were among the earliest English colonies. Virginia began with the Jamestown settlement of 1607. The London Company, an organization of English merchants, sent the settlers to America, hoping that they would find gold and other treasures. But the settlers found no treasures at Jamestown, and they faced great hardships. In about 1612, some Jamestown colonists began growing tobacco, which the London Company sold in Europe.

Maryland was founded by the Calverts, a family of wealthy English Roman Catholics. Catholics were persecuted in England, and the Calverts wanted to provide a place where Catholics could enjoy freedom. Colonists established the first Maryland settlement in 1634.

New England. Puritans, originally financed by English merchants, founded the New England Colonies. Puritans were English Protestants who faced persecution because of their opposition to the Church of England, the official church in England. See **Puritans**.

In 1620, a group of *Separatists* (Puritans who had separated from the Church of England) and other colonists settled in New England. Called *Pilgrims,* they founded the Plymouth Colony along Cape Cod Bay. It was the second permanent British settlement in North America. Between 1628 and 1630, Puritans founded the Massachusetts Bay Colony at what are now Salem and Boston. Plymouth became part of Massachusetts Colony in 1691. See **Massachusetts Bay Colony.**

Connecticut was first settled in 1633 and became a colony in 1636. Colonists settled in Rhode Island in 1636. Rhode Island became a colony in 1647. New Hampshire, first settled in 1623, became a colony in 1680.

The Middle Colonies. Soon after English settlement started, the Dutch founded New Netherland, a trading post and colony that included what are now New York and northern New Jersey. They began a permanent settlement in New York in 1624, and in New Jersey in 1660. In 1638, the Swedes established a trading post and settlement called New Sweden in present-day Delaware and southern New Jersey. The Dutch claimed New Sweden in 1655. But in 1664, the English—far better established in America than the Dutch—took over New Netherland and New Sweden.

Swedes established a small settlement in what is now Pennsylvania in 1643. In 1681, William Penn of England received a charter that made him proprietor of Pennsylvania. Penn was a *Quaker*—a religious group that was persecuted in many countries (see **Quakers**). At Penn's urging, Quakers and other settlers who sought freedom flocked to Pennsylvania. Penn carefully planned settlements in his colony, and Pennsylvania thrived.

The Southern Colonies. In 1663, King Charles II gave the land between Virginia and Florida, called Carolina, to eight proprietors. Virginians had set up a settlement in the northern part of Carolina about 10 years earlier. After 1663, Carolina attracted English settlers, French Protestants called Huguenots, and Americans from other colonies. In 1712, the northern two-thirds of the region was divided into two colonies, North Carolina and South Carolina. The southern one-third of Carolina remained largely unsettled until 1733. Then, James Oglethorpe of England founded Georgia there.

Life in colonial America

Reports of the economic success and religious and political freedom of the early colonists attracted a steady flow of new settlers. Through immigration and natural growth, the colonial population rose to $1\frac{1}{3}$ million by 1753. Most of the settlers came from Britain, but the colonies also drew newcomers from almost every other country of Western Europe. In addition, the slave trade brought in so many Africans that, by the 1750's, blacks made up about 20 per cent of the population.

The colonists. Europeans knew that a person who went to America faced great hardship and danger. But the New World also offered people the opportunity for a new start in life. Some Europeans went to America seeking religious freedom. In addition to the Puritans, Roman Catholics, Quakers, and Huguenots, they included Jews and members of German Protestant sects.

Other people who went to America had no choice in the matter. They included prisoners from overcrowded English jails, Irishmen captured by the English in battle, and black Africans captured in intertribal warfare and sold to European traders. The prisoners and captives were sold into service in America.

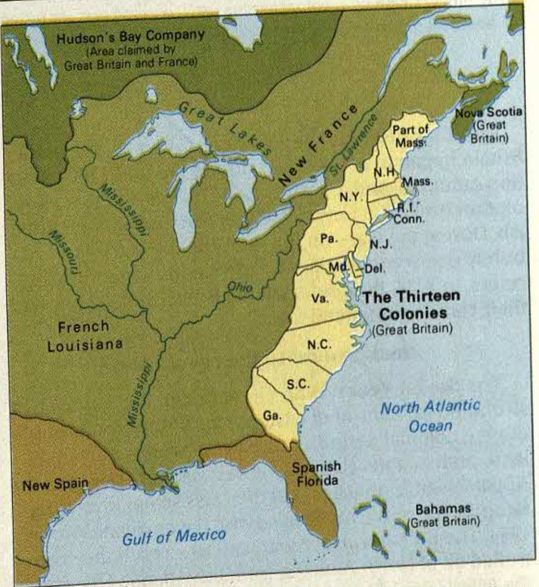
The economy. The earliest colonists had to struggle to produce enough food to stay alive. But before long, colonial America had a thriving economy. Planters grew large crops of rice, indigo, and tobacco. Small farmers raised livestock and grew such crops as maize and wheat. When not busy in their fields, many farmers fished or hunted. Some cut timber from forests to provide the materials for such products as barrels and ships. The colonists used part of what they produced, but they exported large quantities of goods. They traded chiefly with Britain, whose manufacturing firms depended on raw materials from its colonies. In return, they received manufactured goods. The colonies also traded with the French, Dutch, and Spanish.

The colonists and government. The colonists rejected the old idea that government was an institution inherited from the past. Instead, they regarded it as something they themselves had created for their own use. The colonists lived under British rule. But to them, laws made in Britain meant little until they were enforced on the spot. They often ignored British laws. This independent attitude would soon lead to a clash between the Americans and the British.

For more information on life in the American Colonies, see **Colonial life in America.**

Important dates (1607-1753)

1607	About 100 colonists founded Jamestown, the first permanent British settlement in North America.
1619	Virginia established the House of Burgesses, the first representative legislature in America.
1620	The Pilgrims founded Plymouth Colony, the second permanent British settlement in North America.
1624	The Dutch established the settlement of New Netherland.
1636	Harvard—the first college in the colonies—was founded.
1638	People from Sweden established the settlement of New Sweden.
1647	Massachusetts established the first colonial state school system.
1649	Maryland passed the first religious toleration act in North America.
1664	England took control of New Netherland and New Sweden.
1704	*The Boston News-Letter,* the first successful colonial newspaper, began publication.
1752	Benjamin Franklin flew a homemade kite during a storm to prove that lightning is a form of electricity.



The thirteen colonies stretched along the eastern coast of North America. French territory lay to the north and west of the colonies, and Spanish territory lay to the south.

Detail of *Raising the Liberty Pole,* an engraving by John McRae; Kennedy Galleries, Inc., New York City

Joyful celebrations followed the signing of the Declaration of Independence on July 4, 1776. The scene above shows colonists raising a liberty pole to mark the occasion. On the right, colonial army officers sign up a volunteer for service in the war for independence against Great Britain.

The movement for independence

Relations between the American Colonies and Great Britain began to break down during the mid-1700's. Friction mounted, and, on April 19, 1775, the American Revolution broke out between the Americans and the British. During the war—on July 4, 1776—the colonists boldly declared their independence from their British rulers. In 1783, they defeated the British and established their claim to independence.

Background to the revolution

The Seven Years' War. Great Britain and France had struggled for control of eastern North America throughout the colonial period. As their settlements moved inland, both nations claimed the vast territory between the Appalachian Mountains and the Mississippi River. The struggle led to the outbreak of the Seven Years' War in 1754. The British won the war, and as a result they controlled all of North America from the Atlantic Ocean to the Mississippi River. The war triggered a series of British policy changes that eventually led to the colonial independence movement.

British policy changes. The Seven Years' War created problems for the British. After the war, Britain had to find ways to strengthen its control over its enlarged American territory. George III, who had become king of Great Britain in 1760, instructed the British Parliament to establish policies to solve these problems.

King George and Parliament believed the time had come for the colonists to start obeying trade regulations and paying their share of the cost of maintaining the British Empire. In 1764, Parliament passed the Sugar Act. This law provided for the efficient collection of taxes on molasses brought into the colonies. The Stamp Act of 1765 extended to the colonies the traditional English tax on newspapers, legal documents, and other printed matter (see **Stamp Act**).

Colonial reaction. The colonists bitterly opposed the new British policies. The colonists were not represented in Parliament. Therefore, they argued, Britain had no right to tax them. The colonists expressed this belief in the slogan, "Taxation Without Representation is Tyranny."

To protest against the new laws, colonists organized a widespread boycott of British goods. The colonial boycott and resistance alarmed Britain's leaders. In 1766, Parliament repealed the offensive Stamp Act.

The road to independence

Renewed conflict. The relaxation of tensions between the Americans and the British proved to be short-lived. In 1767, Parliament passed the Townshend Acts, which taxed lead, paint, paper, and tea imported into the colonies. These and other laws renewed discontent among the colonists. As tensions between the Americans and British grew, Britain reacted by sending troops into Boston and New York City.

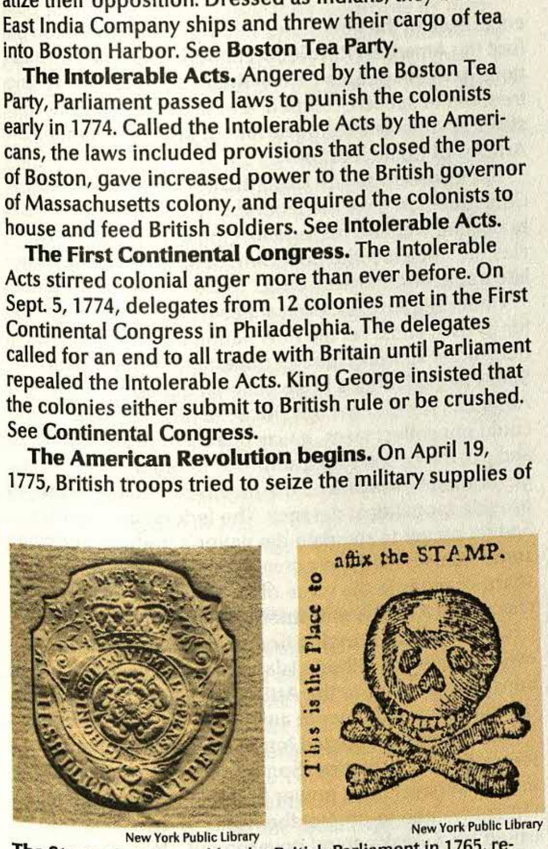
The sight of British troops in the city streets aroused colonial anger. On March 5, 1770, Boston civilians taunted a group of troops. The troops fired on the civilians, killing three people and wounding eight others, two of whom died later. This incident, called the Boston Massacre, shocked Americans and unnerved the British government.

In 1770, Parliament repealed all provisions of the Townshend Acts with one exception—the tax on tea. Furious Americans vowed not to use tea and colonial merchants refused to sell it. On Dec. 16, 1773, a group of American colonists staged the Boston Tea Party to dramatize their opposition. Dressed as Indians, they boarded East India Company ships and threw their cargo of tea into Boston Harbor. See **Boston Tea Party.**

The Intolerable Acts. Angered by the Boston Tea Party, Parliament passed laws to punish the colonists early in 1774. Called the Intolerable Acts by the Americans, the laws included provisions that closed the port of Boston, gave increased power to the British governor of Massachusetts colony, and required the colonists to house and feed British soldiers. See **Intolerable Acts.**

The First Continental Congress. The Intolerable Acts stirred colonial anger more than ever before. On Sept. 5, 1774, delegates from 12 colonies met in the First Continental Congress in Philadelphia. The delegates called for an end to all trade with Britain until Parliament repealed the Intolerable Acts. King George insisted that the colonies either submit to British rule or be crushed. See **Continental Congress.**

The American Revolution begins. On April 19, 1775, British troops tried to seize the military supplies of the Massachusetts militia. This action led to the start of the American Revolution. Colonial leaders met in the Second Continental Congress on May 10, 1775. The Congress faced the task of preparing the colonies for war. It organized the Continental Army, which colonists from all walks of life joined.


affix the STAMP.
This is the Place to

New York Public Library

New York Public Library

The Stamp Act, passed by the British Parliament in 1765, required colonists to buy stamps as a tax on printed matter. A tax stamp appears on the left, *above.* A colonial illustrator drew a skull and crossbones—a symbol of death—*right,* to protest against the law.

King George officially declared the colonies in rebellion on Aug. 23, 1775. Some people—called *Loyalists*—favoured submission to British rule, but a growing number supported the fight for independence.

The Declaration of Independence. On July 4, 1776, the Second Continental Congress officially declared independence and formed the United States of America by adopting the Declaration of Independence. It stated that all men are created equal, and are endowed by their Creator with rights to life, liberty, and the pursuit of happiness. To protect those rights, men organized governments, and the governments derived their powers from the consent of the governed. But when a government ceased to preserve the rights, it was the duty of the people to change the government, or abolish it and form a new one. See **Declaration of Independence.**

Victory over a great empire. The Americans were challenging the world's most powerful empire in the American Revolution. The war raged on through the 1770's. Then, on Oct. 19, 1781, the Americans won a decisive victory at the Battle of Yorktown in Virginia. Thousands of British soldiers surrendered there. Within months, the British government decided to seek peace. Finally, on Sept. 3, 1783, the Americans and the British signed the Treaty of Paris of 1783, officially ending the American Revolution.

For a detailed account of the war for independence, see **American Revolution.**

Important dates (1754-1783)

1756	A stagecoach line linked New York City and Philadelphia, Pennsylvania.
c. 1757	The first street lights in the colonies were installed in Philadelphia.
1763	Britain defeated France in the Seven Years' War and gained control of eastern North America.
1763	Britain stationed a standing army in North America and prohibited colonists from settling west of the Appalachian Mountains.
1765	The British Parliament passed the Stamp Act, taxing newspapers, legal documents, and other printed matter in the colonies.
1770	British troops killed American civilians in the Boston Massacre.
1773	Colonists staged the Boston Tea Party, dumping British tea into Boston Harbor.
1774	The Intolerable Acts closed Boston Harbor and included other steps to punish the colonists.
1774	The First Continental Congress met to consider action against the British.
1775	The war known as the American Revolution between the colonists and the British began.
1776	The colonists adopted the Declaration of Independence and formed the United States of America.
1781	The Americans defeated the British at Yorktown in the last major battle of the American Revolution.
1783	The Treaty of Paris officially ended the American Revolution.

Signing the Constitution (1860's), an oil painting on canvas by Thomas Rossiter; Independence National Historical Park Collection, Philadelphia, Pennsylvania

The signing of the Constitution, *above,* is among the most historic events in American history. The delegates to the Constitutional Convention signed the document in 1787. Ratified in 1788, the Constitution has served as the basic law of the United States ever since.

Forming a new nation

As a result of the Treaty of Paris of 1783, the new nation controlled all of North America from the Atlantic Ocean to the Mississippi River between Canada and Florida. Canada, to the north, remained British territory. Great Britain returned Florida to Spain, and Spain continued to control the area west of the Mississippi River.

The original 13 colonies made up the first 13 states of the United States. Eventually, the American land west of the Appalachian Mountains was divided into territories.

At the end of the American Revolution, the new nation was still a loose confederation of states. But in 1787, American leaders got together and wrote the Constitution of the United States. The Constitution became the country's basic law and welded it together into a solid political unit. The men who wrote it included some of the most famous and important figures in American history. Among them were George Washington and James Madison of Virginia, Alexander Hamilton of New York, and Benjamin Franklin of Pennsylvania. The authors of the Constitution, along with other early leaders such as Thomas Jefferson of Virginia, won lasting fame as the Founding Fathers of the United States.

At the start of its history, the United States faced severe financial problems. But before long, the skill of its leaders and the spirit and hard work of its people put the country on a sound economic footing. Early America also faced threats from powerful European nations. But masterful diplomacy by Washington and other leaders guided the country through its early years in peace. The peace ended with the War of 1812, in which the United States and Great Britain fought again. After the war, America focused its attention on its development, and entered a period of bustling economic growth.

Establishing a government

The American people began setting up a new system of government as soon as they declared their independence. Each of the new states had its own constitution before the American Revolution ended. The state constitutions gave the people certain liberties, usually including freedom of speech, religion, and the press. In 1781, the states set up a federal government under laws called the Articles of Confederation.

Background to the Constitution. The Articles of Confederation gave the federal government the power to declare war and manage foreign affairs. But the Articles did not allow the government to collect taxes, regulate trade, or otherwise direct the activities of the states.

Under the Articles, each state worked independently for its own ends. Yet the new nation faced problems that demanded a strong federal government. The United States had piled up a huge national debt during the American Revolution. But since the federal government could not collect taxes, it was unable to pay the debt and put the country on a sound economic footing. The government even lacked the means for raising money to provide for national defence. The federal government had no power to regulate the nation's trade. In addition, some states issued their own paper money, causing sharp changes in the value of currency and economic chaos. See **Articles of Confederation.**

Creating the Constitution. In 1787, delegates from every state except Rhode Island met in Philadelphia to consider revisions to the Articles of Confederation. The delegates agreed to write an entirely new Constitution.

The delegates debated long and hard over the contents of the Constitution. Some of them wanted a document that gave much power to the federal government. Others wanted to protect the rights of the states and called for a weak central government. Delegates from large states claimed their states should have greater representation in Congress than the small states. But small-state delegates demanded equal representation in Congress.

The delegates finally reached agreement on a new Constitution on Sept. 17, 1787. The document they produced has often been called a work of political genius. The authors worked out a system of government that satisfied the opposing views of the people of the 1780's. At the same time, they created a system of government flexible enough to continue in its basic form to the present day.

The Constitution provided for a two-house legislature—a House of Representatives and a Senate. Representation in the House was based on population in order to satisfy the large states. All states received equal representation in the Senate, which pleased the small states. The Constitution gave many powers to the federal government, including the rights to collect taxes and regulate trade. But the document also reserved certain powers for the states. The Constitution provided for three branches of government: the executive, headed by a president; the legislature, made up of the two houses of Congress; and the judiciary, or federal court system. The creators of the Constitution provided for a system of checks and balances among the three branches of government. Each branch received powers and duties that ensured that the other branches would not have too much power.

Adopting the Constitution. Before the Constitution became law, it needed *ratification* (approval) by nine states. Some Americans still opposed the Constitution, and fierce debate over ratification broke out. Finally, on June 21, 1788, New Hampshire became the ninth state to ratify.

The Bill of Rights. Much opposition to the new Constitution stemmed from the fact that it did not specifically guarantee enough individual rights. In response, 10 amendments known as the Bill of Rights were added to the document. The Bill of Rights became law on Dec. 15, 1791. Among other things, it guaranteed freedom of speech, religion, the press, and the rights to trial by jury and peaceful assembly. For more details, see **Bill of Rights.**

Setting up the government. The Constitution provided that the president be elected by an Electoral College, a group of people chosen by the states (see **Electoral College**). In 1789, the Electoral College unanimously chose Washington to serve as the first president. It reelected him unanimously in 1792. The government went into operation in 1789, with its temporary capital in New York City. The capital was moved to Philadelphia in 1790, and to Washington, D.C., in 1800.

Early problems and politics

Solving financial problems. Americans were divided over how to deal with the financial problems that plagued the new government. One group, led by Secretary of the Treasury Alexander Hamilton, wanted the federal government to take vigorous action. Another group, headed by Secretary of State Thomas Jefferson, opposed government participation in economic affairs.

Hamilton proposed that the federal government increase tariffs and tax certain products made in the United States. The government would use the tax money to pay both its debts and the debts of the states. Hamilton also proposed a government-supported national bank to control government finances.

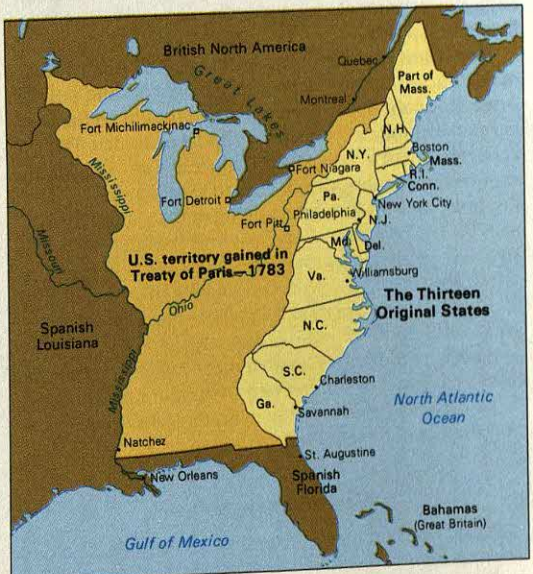
Jefferson and his followers, who included many Southerners, finally agreed to support some of Hamilton's financial proposals. In return, Hamilton agreed to support a shift of the national capital to the South. Congress approved Hamilton's financial plan and agreed to locate the capital in the South. As a result of this compromise, the capital moved to Washington, D.C., in 1800. Jefferson continued to oppose the national bank proposal. But in 1791, Congress chartered a national bank for 20 years.

Foreign affairs. The new government also faced problems in foreign affairs. In 1793, France went to war against Britain and Spain. France had helped the Americans in the American Revolution, and it now expected U.S. assistance in its war. Americans disagreed over which side to support. Jefferson and his followers wanted the United States to back France, while Hamilton and his group favoured the British.

President Washington insisted that the United States remain neutral in the European war. He rejected French demands for support, and also sent diplomats to Britain and Spain to clear up problems with those countries.

Important dates (1784-1819)

1787	The Founding Fathers wrote the Constitution.
1790's	The first U.S. political parties developed.
1790	Samuel Slater built the country's first successful water-powered machines for spinning cotton.
1793	Eli Whitney developed a toothed cotton gin.
1800	Washington, D.C., became the national capital.
1803	The Louisiana Purchase almost doubled the size of the United States.
1811	Work began on the National Road, which—when completed—linked the East and the Midwest.
1812-1815	The United States and Great Britain fought the War of 1812.
1814	Francis Scott Key wrote "The Star-Spangled Banner."



The United States after the revolution extended from the Atlantic Ocean to the Mississippi River. British territory lay to the north, and Spanish territory lay to the west and south.

Chief Justice John Jay, acting for Washington, negotiated the Jay Treaty with Britain in 1794. The treaty's many provisions included a trade agreement with Britain which—in effect—ended American trade with France. It also included a British promise to remove troops still stationed on U.S. territory. In 1795, Thomas Pinckney negotiated the Pinckney Treaty, or Treaty of San Lorenzo, with Spain. This treaty settled a dispute over the Florida border between the United States and Spain and also gave the United States free use of the Mississippi River.

In 1796, Washington—annoyed by the disputes within his Administration—refused to seek a third term as president. John Adams succeeded him in 1797. At about that time, French warships began attacking American merchant vessels. Adams, like Washington, hoped to use diplomacy to solve foreign problems. He sent diplomats to France to try to end the attacks. But three agents of the French government insulted the diplomats with dishonourable proposals, including a demand for a bribe. The identity of the agents was not revealed. They were simply called *X*, *Y*, and *Z*, and the incident became known as the XYZ Affair.

The XYZ Affair created a furore in the United States. Hamilton and his followers demanded war against France. But Adams was determined to keep the peace. In 1799, he again sent diplomats to France. This time, the United States and France reached a peaceful settlement. See **XYZ Affair.**

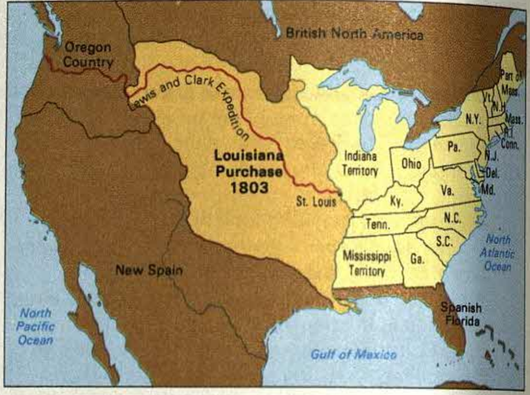
Establishing political parties. Washington and many other early American leaders opposed political parties. But in the 1790's, the disputes over government policies led to the establishment of two political parties in the United States. Hamilton and his followers, chiefly Northerners, formed the Federalist Party. The party favoured a strong federal government and generally backed Great Britain in international disputes. Jefferson and his followers, chiefly Southerners, established the Democratic-Republican Party. The party wanted a weak central government and generally sided with France in foreign disputes.

The Alien and Sedition Acts. The XYZ Affair had a major impact on American internal policies and politics. After the affair, the Federalist Party denounced the Democratic-Republicans for their support of France. The Federalists had a majority in Congress. They set out to silence their critics, who included Democratic-Republicans and foreigners living in the United States. In 1798, the Federalist Congress and President Adams—also a Federalist—approved the Alien and Sedition Acts. These laws made it a crime for anyone to criticize the president or Congress, and subjected foreigners to unequal treatment.

A nationwide outcry against these attacks on freedom followed. The most offensive parts of the Acts soon expired or were repealed. However, the Alien and Sedition Acts gave the Federalists the reputation as a party of oppression.

Jeffersonian democracy

Public reaction to the Alien and Sedition Acts helped Thomas Jefferson win election as president in 1800 and again in 1804. Jefferson's political philosophy became known as *Jeffersonian democracy.* Jefferson envisioned the United States as a nation of small farmers. In Jefferson's ideal society, the people would lead simple, but productive, lives and be able to direct their own affairs. Therefore, the need for government would decline. Jefferson took steps to reduce government expenses and the national debt. But in spite of his beliefs and practices, Jefferson found that as president he could not avoid actions that expanded the role of government.



The Louisiana Purchase of 1803 added to the United States the territory between the Mississippi River and the Rocky Mountains. The purchase almost doubled the country's size.

The Louisiana Purchase, the first major action of Jefferson's presidency, almost doubled the size of the United States. In 1801, Jefferson learned that France had taken over from Spain a large area between the Mississippi River and the Rocky Mountains called Louisiana. Spain was a weak nation, and did not pose a threat to the United States. But France—then ruled by Napoleon Bonaparte—was powerful and aggressive. Jefferson viewed French control of Louisiana as a danger to the United States.

In 1803, Jefferson arranged the purchase of the area from France. The Louisiana Purchase added 2,144,476 square kilometres of territory to the United States.

Jefferson and foreign policy. In 1803, Great Britain and France went to war again, and both nations began seizing American merchant ships. The British also *impressed* American seamen, seizing them and forcing them into British service.

Jefferson again found it necessary to use government powers, this time to protect American shipping. At his request, Congress passed trade laws designed to stop the British and French interfering with American trade. But the warring nations continued to interfere.

The War of 1812

James Madison succeeded Jefferson as president in 1809. France soon promised to end its interference with American shipping, but Britain did not. Also, people believed the British were encouraging Indians to attack American pioneers moving westward. For these reasons, many Americans demanded war against Britain. They were led by members of Congress from the West and South called *War Hawks.* Other Americans, especially New Englanders, opposed the War Hawks' demand. But on June 18, 1812, at Madison's request, Congress declared war on Britain and the War of 1812 had begun.

Neither side gained much advantage early in the war. But on Aug. 24, 1814, British troops captured Washington, D.C., and burned the Capitol and other government buildings. This British action made Americans realize their nation's survival was at stake. Large numbers of American volunteers rushed into service, and helped stop the British offensive. The Treaty of Ghent of Dec. 24, 1814, officially ended the War of 1812. Neither side won the war and little was gained from the struggle. See **War of 1812.**

Growing nationalism

A strong spirit of nationalism swept through the United States following the War of 1812. The war itself gave rise to increased feelings of self-confidence and unity. The peace that followed enabled the nation to concentrate on its own affairs. The bitterness that had marked political disputes eased with the breakup of the Federalist Party. Meanwhile, the nation expanded westward, new states entered the union, and the economy prospered. Historians sometimes call the period from about 1815 to the early 1820's *The Era of Good Feeling* because of its relative peace, unity, and optimism.

Nationalism and the economy. After the War of 1812, nationalist politicians proposed economic measures that came to be called the *American System.* They said the government should raise tariffs to protect American manufacturers and farmers from foreign competition. Industry would then grow and employ more people. More employment would lead to greater consumption of farm products, and so farmers would prosper and buy more manufactured goods. In addition, tariff revenues would enable the government to make needed internal improvements.

The government soon put ideas of the American System into practice. In 1816, Congress enacted a high tariff, and it chartered the second Bank of the United States, to give the government more control over the economy. The government also increased its funding of internal projects, the most important of which was the National Road. Begun in 1811, the road stretched from Cumberland, Maryland, to Vandalia, Illinois, when completed. It became an important route for the shipment of goods and the movement of settlers westward.

A national culture. Many early Americans had tried to model their culture on European civilization. Architects, painters, and writers tended to imitate European models. But in the late 1700's and early 1800's, art and culture more and more reflected American experiences. Architects designed simple, but beautiful, houses that blended into their surroundings. Craftworkers built sturdy furniture that was suited to frontier life, yet so simply elegant as to be considered works of art. The nation's literature flourished when it began reflecting American experiences. Political writings such as the works of Thomas Paine had high literary merit. The works of Washington Irving, one of the leading early authors, helped gain respect for American literature.

Decline of the Federalists. In 1814 and 1815, New England Federalists held a secret political meeting in Hartford, Connecticut. Their opponents charged that they had discussed the *secession* (withdrawal) of the New England States from the Union. The Federalists never recovered from the charge, and the party broke up in about 1816. James Monroe, the Democratic-Republican presidential candidate in the election of 1820, was unopposed.

New territory. The United States gained two new pieces of territory between 1815 and 1820. In 1818, a treaty with Britain gave the country the Red River Basin, north of the Louisiana Territory. Spain ceded Florida to the United States in 1819.

"A fire bell in the night." The Era of Good Feeling did not mean an end to all the country's disputes. The issue of slavery was causing deep divisions among the people. Many Northerners were demanding an end to slavery, while Southerners were defending it more and more. Jefferson, then retired, accurately viewed the growing dispute as a warning of approaching disaster, "like a fire bell in the night."

Detail of *Fairview Inn* (1889), a watercolour on paper by Thomas C. Ruckle; Maryland Historical Society, Baltimore, Maryland, U.S.A.

The National Road was a transportation route in early America. When completed, it stretched from Maryland to Illinois. A steady stream of pioneers moved westward along the road. Inns, like this one near the National Road, provided resting and eating stops for travellers.

Prairie Scene: Mirage (1837), a watercolour by Alfred Jacob Miller; Walters Art Gallery, Baltimore, Maryland

Americans moved westward by the thousands during the early 1800's. Hardy pioneers, *above,* piled all their belongings into covered wagons and set out to find new homes in the West. The push westward continued until the nation stretched from coast to coast.

Expansion

During the early 1800's, settlers moved westward over the Appalachian Mountains into the new states and territories. Many of these pioneers even settled beyond the country's western boundary. They flocked into Texas, California, and other western lands belonging to Mexico. Americans also settled in the Oregon Country, a large territory between California and Alaska claimed by both Britain and the United States. During the mid-1800's, the United States gained control of the Mexican lands and the southern part of the Oregon Country, and the nation extended from coast to coast.

The build-up of the West gave rise to changes in American politics. As areas in the West gained large populations, they were admitted to the Union as states. But wealthy Easterners continued to control governmental and economic policy. Western farmers and pioneers, as well as city labourers and craftworkers, soon banded together politically to promote their interests. They found a strong leader in Andrew Jackson, and helped elect him president in 1828. Jackson took steps to reduce the power of wealthy Easterners and aid the "common man." At the same time, other Americans were working for such social reforms as women's rights, improvements in education, and the abolition of slavery.

The United States and Europe maintained peaceful relations during the Expansion Era. But in 1823, President James Monroe issued the Monroe Doctrine, a statement that warned European countries not to interfere with any of the free nations of the Western Hemisphere (see **Monroe Doctrine**).

America moves west

By 1820, American pioneers had established many frontier settlements as far west as the Mississippi River. By the 1830's, the Westward Movement had pushed the frontier across the Mississippi, into Iowa, Missouri, Arkansas, and eastern Texas. The land beyond, called the *Great Plains,* was dry and treeless, and seemed to be poor farmland. But explorers, traders, and others who had journeyed farther west told of rich farmland and forests beyond the Rocky Mountains. In the 1840's, large numbers of pioneers made the long journey across the Great Plains to the Far West.

The pioneers included Easterners from both the North and South. Many other pioneers came from Europe seeking a better life. Some people went west in search of religious freedom. The best known of these were the Mormons, who settled in Utah in 1847.

For more details on the pioneers, see **Westward movement.**

Manifest destiny. By the mid-1840's, thousands of Americans lived in the Oregon Country and on the western land claimed by Mexico. By then, large numbers of Americans had come to believe in the doctrine of *manifest destiny.* That is, they thought the United States should control all of North America. Stirred by this belief, Americans demanded control of Oregon and the Mexican territory.

The conflicting claim with Great Britain over Oregon was settled with relative ease. Britain decided that the effort needed to hold all of Oregon was not worthwhile. In 1846, the British government turned over to the United States the part of the Oregon territory south of the 49th parallel, except Vancouver Island.

The struggle over the Mexican territory was more complicated. It began in Texas in 1835, when the American settlers there staged a revolt against Mexican rule. In 1836, the settlers proclaimed Texas an independent republic, but also requested U.S. statehood. Nine years later, the United States annexed Texas and made it a state. The United States gained more Mexican territory as a result of the Mexican War (1846-1848), which was fought between the United States and Mexico over a number of disagreements, including territorial disputes. The treaty that ended the war gave the United States a vast stretch of land from Texas west to the Pacific and north to Oregon.

In 1853, in the Gadsden Purchase, America bought from Mexico the strip of land that makes up the southern edge of Arizona and New Mexico. The United States then owned all the territory of its present states except Alaska (purchased from Russia in 1867) and Hawaii (annexed in 1898). See **Mexican War.**

Expansion and the Indians. As the pioneers moved westward, they took over much of the land that Indians had occupied for thousands of years. Fighting often broke out between the pioneers and Indians. The United States government sent soldiers to battle against the Indians and the soldiers won most of these so-called Indian Wars. By the mid-1800's, the government had moved almost all the eastern Indians west of the Mississippi River.

Expansion and the economy. Expansion into the rich interior of the continent enabled the United States to become the world's leading agricultural nation. New techniques and machines boosted the output of America's farms. Eli Whitney's cotton gin, invented in 1793, came into widespread use in the 1800's. It enabled cotton growers to separate cotton fibre from the seeds as fast as 50 people could by hand. The reaper, patented by Cyrus McCormick in 1834, allowed farmers to harvest grain much more quickly than before. See **Cotton gin; Reaper.**

The discovery of minerals in the West also aided America's economy. The most famous mineral strike took place in 1848, when gold was discovered at Sutter's Mill in California. See **Forty-niner; Gold rush.**

The period also marked the beginning of large-scale manufacturing in the United States. Previously, most manufacturing was done by craftworkers at home or in small shops. But beginning in the early 1800's, businesses erected factories equipped with modern machinery that enabled them to produce goods more rapidly. Manufacturing remained centred in the East, but some Western towns developed industries.

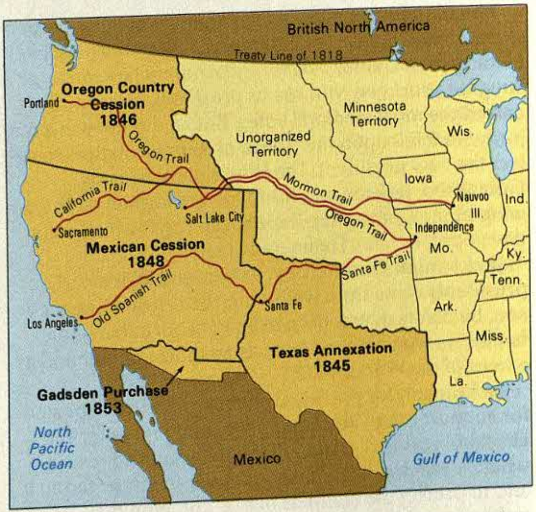
Developments in transportation also contributed immensely to economic growth in the United States. In 1807, Robert Fulton demonstrated the first commercially successful steamboat, the *Clermont.* The steamboat soon became the fastest and most important means of shipping goods. Americans of the early 1800's built many canals to connect their natural waterways. The Erie Canal, the most important one, was completed in 1825. It opened a water passage from the Hudson River in New

Detail of *The Trail of Tears* (1942), an oil painting on canvas by Robert Lindneux; Woolaroc Museum, Bartlesville, Oklahoma

Eastern Indians were forced to move to territory west of the Mississippi River during the Expansion Era as whites took over their land. The Cherokee Indians experienced one of the most difficult journeys, known as the *Trail of Tears, above.*

Important dates (1820-1849)

1820	The Missouri Compromise ended a slavery dispute.
1823	The Monroe Doctrine warned Europeans against interference in Western Hemisphere affairs.
1825	The Erie Canal opened, providing a water route from the Atlantic Ocean to the Great Lakes.
1830	The *Tom Thumb,* the nation's first commercial steam locomotive, operated in Baltimore, Maryland.
1832	South Carolina threatened secession over a tariff.
1834	Cyrus McCormick patented the reaper.
1837	Samuel Morse demonstrated the first successful telegraph in the United States.
1846	Britain ceded the southern part of the Oregon Country to the United States.
1848	Victory in the Mexican War gave the United States vast new territory in the West.
1848	The discovery of gold in California triggered the Gold Rush.



Expansion in the mid-1800's extended the nation westward to the Pacific Ocean. The Oregon Country was ceded to the U.S. by Britain. The rest of the new territory came from Mexico.

York to the Great Lakes in the Midwest. Boats used the canal to carry manufactured products from the East to the West and farm products and raw materials from the West to the East (see **Erie Canal**).

The steam-powered railway soon rivalled the steamboat in importance as a means of shipping. In the 1820's, American railways were still in the experimental stage. But by 1850, about 14,500 kilometres of railway lines were in operation.

In 1837, Samuel F. B. Morse demonstrated the first successful telegraph in the United States. The telegraph soon gave businesses the fastest means of communication yet known. An expanded postal system also helped speed communications.

Cultural change. After 1820, the wilderness seemed less and less hostile to Americans. Increasingly, society glorified the frontier and nature. The public eagerly read the novels of James Fenimore Cooper, which described Indians and pioneers as pure of heart and noble in deeds. Ralph Waldo Emerson and other American philosophers praised nature as a source of truth and beauty available to all people, rich and poor alike.

Developments in printing spread art and information to more people than ever before. A new printing process called *lithography* enabled artists to produce many copies of their works cheaply. Large numbers of Americans bought and decorated their homes with lithographs. The lithographs of Nathaniel Currier and James Merritt Ives were especially popular. They depicted everyday American scenes, customs, and events—often in a sentimental style. Faster printing presses reduced the cost of printing newspapers. After 1835, many newspaper publishers lowered the cost of their papers to a penny, a price even poor people could afford. But the spoken word remained an important means of mass communication. Large numbers of people attended gatherings where political candidates, pleaders of special causes, and famous lawyers and members of the clergy made speeches.

Politics and the "common man"

The election of 1824 led to renewed political friction in the United States. Four Democratic-Republicans, including John Quincy Adams and Andrew Jackson, sought to succeed Monroe as president. Jackson received the most electoral votes. But he did not win a majority, so it fell upon the House of Representatives to select the new president. The House chose Adams. Embittered, Jackson and his followers formed a separate wing of the Democratic-Republican Party, which soon developed into the Democratic Party.

Jacksonian Democracy. Adams and all the earlier presidents came from well-to-do Eastern families. Jackson, by contrast, was born in a log cabin into a poor family. He won national fame as an Indian fighter and as a hero of the War of 1812.

Jackson ran for president again in 1828. He appealed for support from Western farmers and pioneers, and city labourers and craftworkers. He promised to end what he called a "monopoly" of government by the rich and to protect the interests of the "common man." His policy of equal political power for all became known as *Jacksonian Democracy.* Jackson's background and policies gained him much support in the West and in the nation's growing cities. The voters elected him president by large majorities in 1828 and again in 1832.

Jackson as president. When Jackson became president, many wealthy Easterners held what were, in effect, lifelong appointments to federal government jobs. Jackson dismissed many of these people from office, replacing them with his supporters. Some historians consider this action the start of the *spoils system* (the practice of giving public offices as rewards for party services) in the federal government.

Jackson's main crusade against the wealthy involved the second Bank of the United States. The bank's duties included regulating the nation's money supply. Jackson believed the bank operated as a monopoly that favoured the wealthy. In 1832, Congress voted to recharter the bank, but Jackson vetoed the bill. He soon withdrew the government's money from the bank, and the bank later collapsed.

The other great issue of Jackson's administration involved the tariff and nullification. In 1828, Congress passed a bill that placed high tariffs on goods imported into the United States. The South believed the bill favoured New England manufacturing interests, and denounced it as a "tariff of abominations." In 1832, Congress lowered tariffs somewhat, but not enough to please South Carolina. South Carolina declared the tariff acts "null and void," and threatened to secede from the Union if the federal government tried to collect tariffs in the state. This action created a constitutional crisis. Jackson believed in states' rights, but maintained the Union must be preserved. In 1833, he persuaded Congress to pass the *Force Bill,* which allowed him to use the armed forces to collect tariffs. But Congress lowered tariffs to a point acceptable to South Carolina, and the nullification crisis ended. See **Nullification.**

Politics after Jackson. Jackson's influence on politics continued after he left office. As undisputed leader of the Democrats, Jackson designated Martin Van Buren to be the party's candidate in the 1836 presidential election. Jackson's opponents had formed the Whig Party four years earlier. In an attempt to attract followers of Jackson, most Whigs supported William Henry Harrison to oppose Van Buren. Harrison, like Jackson, had won fame as a war hero. But the voters, still loyal to Jackson, elected Van Buren.

A depression called the Panic of 1837 crippled the American economy shortly after Van Buren took office, but prosperity later returned. The presidential election of 1840 again matched Van Buren and Harrison. In their campaign, the Whigs made some attempt to criticize Van Buren's economic policies, but for the most part they ignored issues. Instead, they promoted Harrison as a war hero and associated him with the log cabin and other symbols of the frontier. In this way, they appealed to many of Jackson's frontier supporters, and Harrison won the election.

Social reform

During the Expansion Era, many Americans came to believe that social reforms were needed to improve their society. Reformers worked to reduce the working day of labourers from the usual 12 or 14 hours to 10 hours. Other reformers worked to improve conditions in prisons and insane asylums. Prohibitionists—con-

The Camden and Amboy Railroad with the Engine "Planet" in 1834 (1904), an oil painting on canvas by Edward Lamson Henry; Graham Gallery, New York City.

Railways and steamboats became important means of transportation during the Expansion Era. In the scene above, New Jersey travellers transfer from a steamboat, *background,* to a train. A stagecoach and a carriage—two other means of transportation—appear on the right.

vinced that drunkenness was the chief cause of poverty and other problems—persuaded 13 states to outlaw the sale of alcohol between 1846 and 1855. Other important targets of reformers were women's rights, improvements in education, and the abolition of slavery.

The drive for women's rights. Early American women had few rights. There were almost no colleges for women, and most professional careers were closed to them. A married woman could not own property. Instead, any property she had legally belonged to her husband. In addition, American women were barred from voting in all elections.

A women's rights movement developed after 1820, and brought about some changes. In 1835, Oberlin College, Ohio, became the first men's college in the United States to admit women. In 1848, New York became the first state to allow married women to own property. That same year, a Woman's Rights Convention in Seneca Falls, New York, issued the first formal appeal for *woman suffrage* (the right to vote). But nationwide suffrage did not come about until 1920.

Education reform. In the early 1800's, most good schools in the United States were expensive private schools. Poor children went to second-rate "pauper," or "charity," schools, or did not go at all. During the 1830's, Horace Mann of Massachusetts and other reformers began demanding education and better schools for all American children. States soon began establishing state school systems, and more and more children received an education. Colleges started training teachers for a system of public education based on standardized courses of study. As a result, schoolchildren throughout the country were taught much the same lessons.

The abolition movement became the most intense and controversial reform activity of the period. Beginning in colonial times, many Americans—called *abolitionists*—had demanded an end to slavery. By the early 1800's, every Northern state had outlawed slavery. But over the years, the plantation system of farming had spread throughout the South, and the economy of the Southern States depended more and more on slaves as a source of cheap labour.

The question of whether to outlaw or allow slavery became an important political and social issue in the early 1800's. Throughout the years, a balance between the number of *free states* (states where slavery was prohibited) and *slave states* (those where it was allowed) had been sought. This meant that both sides would have an equal number of representatives in the United States Senate. As of 1819, the federal government had achieved a balance between free states and slave states. There were 11 of each.

When the Territory of Missouri applied for admission to the Union in 1818, bitter controversy broke out over whether to admit it as a free or slave state. In either case, the balance between free and slave states would be upset. But in 1820, the nation's leaders worked out the Missouri Compromise, which temporarily maintained the balance. Massachusetts agreed to give up the northern part of its territory. This area became the state of Maine, and entered the Union as a free state in 1820. In 1821, Missouri entered as a slave state, and so there were 12 free and 12 slave states.

The Missouri Compromise had another important provision. It provided that slavery would be "forever prohibited" in all the territory gained from the Louisiana Purchase north of Missouri's southern border, except for Missouri itself.

The Missouri Compromise satisfied many Americans as an answer to the slavery question. But large numbers of people still called for complete abolition. Many blacks who had gained their freedom became important speakers for abolition. See **Abolition movement.**

The growing strength of the abolition movement raised fears among Southerners that the federal government would outlaw slavery. Increasingly, the South hardened its defence of slavery. Southerners had always argued that slavery was necessary to the plantation economy. But after 1830, some Southern leaders began arguing that blacks were inferior to whites, and therefore fit for their role as slaves. Even many Southern whites who owned no slaves took comfort in the belief that they were superior to blacks. As a result, Southern support of slavery increased.

The First Day at Gettysburg (1863), an oil painting on canvas by James Walker; West Point Museum, U.S. Military Academy

The American Civil War (1861-1865) ranks among the most tragic events of United States history. It pitted Northerners against Southerners in bloody battle. In the Battle of Gettysburg, *above,* more than 45,000 Americans were killed, wounded, captured, or missing in just three days.

The irrepressible conflict

The long dispute between the North and South over the issue of slavery came to a head after the Mexican War ended in 1848. The vast new area the United States had acquired in the West during the 1840's created a problem Americans could not evade. It was obvious that the new land would sooner or later be split up into territories, and then into states. Proslavery Americans—chiefly Southerners—argued against any restraints on slavery in the new territories and states. Antislavery Americans—mainly Northerners—wanted the federal government to outlaw slavery in the newly acquired lands. Still others proposed the doctrine of *popular sovereignty.* That is, they said the people of the territories and states should decide for themselves whether or not to allow slavery.

At first, the sides tried to settle their differences through debate and compromise. But the dispute over slavery proved to be an "irrepressible conflict," as Senator William H. Seward of New York termed it. On April 12, 1861, the American Civil War broke out between the North and South. In this tragic chapter of United States history, Americans faced Americans in bloody battle.

The North won the Civil War in 1865. The North's victory preserved the Union. And, soon after the war, slavery was outlawed throughout the United States.

Debate and compromise

California applied for statehood in 1849. The application triggered debate over whether California should be admitted as a free state or a slave state. It also heightened the long-standing argument over how to deal with the slavery question.

The Compromise of 1850 succeeded in bringing about agreement on the California slavery question. The Compromise was a series of laws that made concessions to both the North and South. Measures designed to satisfy the North included the admission of California to the Union as a free state and the abolition of the slave trade in Washington, D.C. To try to satisfy Southerners, Congress ruled that when the new territories of New Mexico and Utah became states, the residents would decide whether or not to allow slavery.

The Kansas-Nebraska Act. In the early 1850's, Congress began considering the creation of new territories in the area roughly between Missouri and present-day Idaho. Bitter debate flared up over whether the territories should ban or allow slavery. Those who called for a ban cited the Missouri Compromise to back their position. The land under consideration was part of the area in which the Compromise had "forever prohibited" slavery. But on May 25, 1854, Congress passed the Kansas-Nebraska Act, a law that changed this provision. The law created two territories west of Missouri—Kansas and Nebraska. It provided that the people of Kansas and Nebraska would decide whether or not to allow slavery.

Nationwide turmoil

Few, if any, American laws have had more far-reaching effects than the Kansas-Nebraska Act. Furious antislavery Americans denounced both Northerners and Southerners who had supported the act. Others staunchly defended the act. Everywhere, attitudes toward the slavery question hardened, and capacity for further compromise diminished.

Political and institutional splits. Angered by the Kansas-Nebraska Act, a group of antislavery Americans formed the Republican Party in 1854. Many Democrats and Whigs who opposed slavery left their parties and became Republicans. The stability of the two main political parties before 1854 had helped keep the nation together. Thus, the political divisions deprived the country of an important unifying force. Beginning in the 1840's, large church groups also split along sectional lines and another unifying institution was lost.

Social disorder. After 1854, Southerners increasingly referred to themselves as a separate national group. In the North, abolitionists stepped up their campaign against slavery. On Oct. 17, 1859, abolitionist John Brown and a small band of followers seized the federal arsenal at Harpers Ferry, Virginia (now West Virginia). Brown intended the action as the first step in a general slave uprising. But federal troops easily captured him, and—after a trial—he was hanged.

The election of 1860 also reflected the nation's division. The Democratic Party split into Northern and Southern wings. Only the Republicans remained united. They nominated Abraham Lincoln for president. The Republican unity helped Lincoln win the election.

Secession. Lincoln had earned a reputation as an opponent of slavery, and his election was unacceptable to the South. Eleven Southern states seceded from the Union and formed the Confederate States of America.

The Civil War and Reconstruction

The Civil War began on April 12, 1861, when Southern troops fired on Fort Sumter, a military post in Charleston Harbor. Both sides quickly prepared for battle after the Fort Sumter clash. The North had superior financial and industrial strength, and a larger population than the South. But the South fought valiantly to defend its cause. The South gained the upper hand at first, but the North gradually turned the tide. Finally, Confederate resistance wore down, and Union armies swept through the South. On April 9, 1865, General Robert E. Lee—the commander of the Confederate Army—surrendered to the Union commander General Ulysses S. Grant.

The four years of bloody fighting between the North and South had staggering effects on the nation. No other war in history has taken so many American lives. For more details, see **American Civil War.**

The Emancipation Proclamation. On Jan. 1, 1863, Lincoln issued the Emancipation Proclamation, which declared freedom for slaves in all areas of the Confederacy that were still in rebellion against the Union.

Reconstruction. Toward the end of the Civil War, the North set out to establish terms under which Confederate States would be readmitted to the Union. The process through which the South returned, as well as the period following the war, is called *Reconstruction.*

Northerners divided into two groups over Reconstruction policy. The *moderates* wanted to end the bitterness between the North and South, and the *radicals* believed the South should be punished. President Lincoln might have worked out a compromise. But assassin John Wilkes Booth shot him on April 14, 1865. Lincoln died the next day. Vice President Andrew Johnson became president. He tried to carry out Lincoln's policy, but he was unable to overcome radical opposition.

The Reconstruction programme drafted by Congress included laws to further the rights of blacks. The 13th Amendment to the Constitution (1865) outlawed slavery throughout the United States. The 14th Amendment (1868) confirmed the citizenship of blacks, and the 15th Amendment (1870) made it illegal to deny the right to vote on the basis of race.

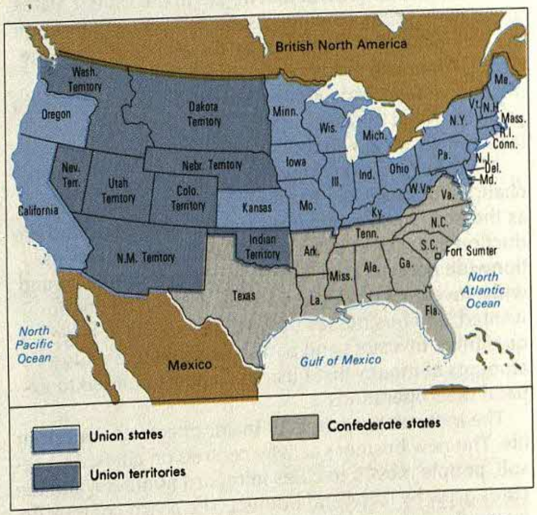
White Southerners loyal to their old traditions bitterly resented the new political system. Many joined the Ku Klux Klan, a secret society that used violence to keep blacks from voting and trying to achieve equality (see **Ku Klux Klan**).

Congress insisted that the Confederate States agree to follow all federal laws before being readmitted to the Union. Between 1866 and 1870, all the Confederate States returned to the Union.

Reconstruction had limited success. It expanded the legal rights of blacks and set up public school systems. But the old social order, based on white supremacy, soon returned to the South. The fundamental problem of the black's place in society remained to haunt future generations. See **Reconstruction.**

Important dates (1850-1869)

1850	The Compromise of 1850 temporarily ended a national crisis over the slavery question.
1854	Passage of the Kansas-Nebraska Act led to nationwide turmoil over the slavery issue.
1860	Pony express riders began carrying mail to the Far West.
1861-1865	The North and the South fought each other in the American Civil War.
1863	The Emancipation Proclamation declared freedom for all slaves in Confederate-held territory.
1865	The 13th Amendment outlawed slavery throughout the United States.
1867	The United States bought Alaska from Russia.
1868	The House of Representatives impeached President Andrew Johnson, but the Senate did not remove him from office.



The Civil War (1861-1865) split the nation into two parts—the Confederacy and the Union. The Confederacy was made up of 11 states that withdrew from the Union in 1860 and 1861.

Forging the Shaft: A Welding Heat (1877), an oil painting on canvas by John Ferguson Weir; The Metropolitan Museum of Art, New York City

America became an industrial giant during the late 1800's. The nation's factories, such as the iron foundry above, began turning out products on a much larger scale than before. Millions of rural Americans and immigrants flocked to the country's cities to work in the booming industries.

Industrialization and reform

The industrial growth that began in the United States in the early 1800's continued steadily up to and through the American Civil War. Still, by the end of the war, the typical American industry was small. Hand labour remained widespread, limiting the production capacity of industry. Most businesses served a small market and lacked the capital needed for business expansion.

After the Civil War, however, American industry changed dramatically. Machines replaced hand labour as the main means of manufacturing, increasing the production capacity of industry tremendously. A new nationwide network of railways distributed goods far and wide. Inventors developed new products the public wanted, and businesses made the products in large quantities. Investors and bankers supplied the huge amounts of money that business leaders needed to expand their operations.

The industrial growth had major effects on American life. The new business activity centred on cities. As a result, people moved to cities in record numbers, and the cities grew by leaps and bounds. The sharp contrast between the rich and the poor and other features of American life stirred widespread discontent. The discontent triggered new reform movements.

The industrial growth centred chiefly on the North. The war-torn South lagged behind the rest of the country economically. In the West, frontier life was ending.

America's role in foreign affairs also changed during the late 1800's and early 1900's. The country built up its military strength and became a world power.

The rise of big business

The value of goods produced by American industry increased almost tenfold between 1870 and 1916. Many interrelated developments contributed to this growth.

Improved production methods. The use of machines in manufacturing spread throughout American industry after the Civil War. With machines, workers could produce goods many times faster than they could by hand. The new large manufacturing firms hired hundreds, or even thousands, of workers. Each worker was assigned a specific job in the production process. This system of organizing labourers, called the *division of labour,* also sped up production.

Development of new products. Inventors created, and business leaders produced and sold, a variety of new products. The products included the typewriter (1867), barbed wire (1874), the telephone (1876), the *phonograph* (early form of record player) (1877), the electric light (1879), and the petrol-engine car (1885).

Natural resources. America's rich and varied natural resources played a key role in the rise of big business. The nation's abundant water supply helped power the industrial machines. Forests provided timber for construction and wooden products. Miners took large quantities of coal and iron ore from the ground.

A growing population. More than 25 million immigrants entered the United States between 1870 and 1916. Immigration plus natural growth caused the U.S. population to more than double during the same period, rising from about 40 million to about 100 million.

Distribution and communication. In the late 1800's, the American railway system became a nationwide transportation network. The total distance of all railway lines in operation in the United States soared from about 14,500 kilometres in 1850 to almost 320,000 kilometres in 1900. A high point in railway development came in 1869, when workers laid tracks that joined the Central Pacific and Union Pacific railways near Ogden, Utah. This event marked the completion of the world's first transcontinental railway system. The system linked the United States by rail from coast to coast.

The new railways spurred economic growth. Mining companies used them to ship raw materials to factories over long distances quickly. Manufacturers distributed their finished products by rail to points throughout the country. The railways became highly profitable businesses for their owners.

Advances in communication provided a boost for the economy. Railways replaced such mail-delivery systems as the stagecoach. In 1876, Alexander Graham Bell invented the telephone. These developments, along with the telegraph, provided the quick communication that is vital to the smooth operation of big business.

Investment and banking. The business boom triggered a sharp increase in investments in the stocks and bonds of corporations. As businesses prospered, people eager to share in the profits invested heavily. Their investments provided capital that companies needed to expand their operations.

New banks sprang up throughout the country. Banks helped finance the nation's economic growth by making loans to businesses. Some bankers of the era assumed key positions in the American economy because of their ability to provide huge sums of capital.

The South and the West

The war-torn South. After the Civil War, Americans in the South faced the task of rebuilding their war-torn society. The South lagged behind the rest of the nation economically. Some industry developed in the region, but the South remained an agricultural area throughout the period of industrialization.

Many Southern farmers—both black and white—owned the land they worked. But in general, the land of these small, independent farmers was poor. The best land was given over to tenant farming—a system in which labourers farm the land and pay rent in money or crops to the owner. The tenant farming system had neither the virtues of the plantation system of pre-Civil War days nor of the independent owner system. The tenant farmers lacked the incentive to improve land that was not their own, and the owners did not have full control over production. For these and other reasons, agriculture remained more backward in the South than elsewhere.

The end of the Western frontier. The long process of settling the United States from coast to coast drew to a close after the Civil War. In 1862, Congress passed the Homestead Act, which offered public land to people free or at very low cost. Thousands of Americans and immigrants started farms in the West under the provisions of the act.

After 1870, settlement became so widespread in the West that it was no longer possible to draw a continuous frontier line. The United States Census of 1890 officially recognized the fact that America's frontier had ended.

The settlement of the West brought an end to the American Indian way of life. Farmers occupied and fenced in much of the land. White people moving westward slaughtered buffalo herds on which Indians depended for survival. Some Indians retaliated against the whites by attacking wagon trains and homes. But, as in earlier days, the federal government sent soldiers to crush the Indian uprisings. In the end, the Indians were no match for the soldiers and their superior weapons. Over the years, the federal government pushed more and more Indians onto reservations. For more details, see **Indian, American** (The fall of Indian America).

Life during the industrial era

The industrial boom had major effects on the lives of the American people. The availability of jobs in industries drew people from farms to cities in record numbers. In 1870, only about 25 per cent of the American people lived in urban areas. By 1916, the figure had reached almost 50 per cent.

The lives of people in the cities contrasted sharply. A small percentage of them had enormous wealth and enjoyed lives of luxury. Below them economically, the larger middle class lived comfortably. But at the bottom of the economic ladder, a huge mass of city people lived in extreme poverty.

The wealthy. The business boom opened up many opportunities for financial gain. The economic activity it generated enabled many people to establish successful businesses, expand existing ones, and profit from investments. Some business leaders and investors were able to amass huge fortunes. The number of millionaires in the United States grew from perhaps about 20 in 1850 to more than 3,000 in 1900.

Important dates (1870-1916)

1876	Alexander Graham Bell invented the telephone.
1877	Thomas Edison invented the phonograph.
1879	Edison invented the electric light.
1884	The world's first skyscraper was begun in Chicago.
1886	The American Federation of Labor was founded.
1898	The United States defeated Spain in the Spanish-American War.
1903	The Wright Brothers made the first successful aeroplane flight at Kitty Hawk, North Carolina.
1913	The 16th Amendment to the Constitution gave the federal government the power to levy an income tax.
1914	World War I began in Europe.

The middle class. Other city people prospered enough to live lives of comfort, if not wealth. They included owners of small businesses, and such workers as factory and office managers. They became part of America's growing middle class.

The underprivileged. The labourers who toiled in factories, mills, and mines did not share in the benefits of the economic growth. They usually worked at least 60 hours a week for an average pay of about 20 cents an hour, and had no fringe benefits.

As the nation's population grew, so did the competition for jobs. The supply of workers outstripped the demand. The oversupply of workers led to high unemployment. In addition, depressions slowed the economy to a near standstill in 1873, 1884, 1893, and 1907.

The everyday life of the city poor was dismal and drab. The poor lived crowded together in slums. Much of their housing consisted of cheap apartment buildings called *tenements.* The crowded slum neighbourhoods bred crime. Overwork, poor sanitation, and inadequate diet left slum dwellers vulnerable to disease. Many poor children received little or no education, because they had to work to contribute to their families' welfare.

The farmers. American farmers also suffered hardships after the Civil War. Advances in agricultural equipment and techniques had enabled most of the farmers to increase their production. However, *middlemen* between the farmers and the consumers took a large share of the money earned from farm products. The middlemen included owners of railways, mills, and gins.

The Gilded Age. American author Mark Twain called the era of industrialization "The Gilded Age." Twain used this term to describe the culture of the newly rich of the period. Lacking tradition, the wealthy developed a showy culture supposedly based on the culture of upper-class Europeans. The enormous mansions of the newly rich Americans imitated European palaces. The wealthy filled the mansions with European works of art, antiques, rare books, and gaudy decorations.

Most Americans, however, had a far different idea of culture. They enjoyed fairs that exhibited industrial machines, the latest inventions, and other items related to America's material progress. The American people were eager spectators at circuses, vaudeville shows, and sporting events. Baseball became so popular after 1900 that it was called the *national pastime.* Also after 1900, a new kind of entertainment, the cinema, began attracting public interest.

Government and the people. After the Civil War, the Democratic and Republican parties developed strong *political machines.* Members of these organizations kept in contact with the people, and did them favours in return for votes. But in general, political leaders strongly favoured business interests.

Government of the era was also marked by widespread corruption. Ulysses S. Grant became president in 1869. Members of Grant's administration used their government positions for their own financial gain. Corruption also flourished in state and local government.

Reform

Western History Collections, University of Oklahoma Library

Farmers flocked to the Great Plains during the late 1800's. The Kansas farm family above built their house from turf. The Plains had few trees, and so timber for building was scarce.

A strong spirit of reform swept through the United States during the late 1800's and early 1900's. Many Americans called for changes in the country's economic, political, and social systems. They wanted to reduce poverty, improve the living conditions of the poor, and regulate big business. They worked to end corruption in government, make government more responsive to the people, and accomplish other goals. By 1917, the reformers had brought about many changes. Some reformers called themselves *progressives.* As a result, the period of American history from about 1890 to about 1917 is often called the *Progressive Era.*

Early reform efforts included movements to organize labourers and farmers. In 1886, skilled labourers formed the American Federation of Labor (AFL)—now the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO). Led by Samuel Gompers, this union bargained with employers and gained better wages and working conditions for its members. Farmers founded the National Grange in 1867 and Farmers' Alliances during the 1870's and 1880's. These groups helped force railways to lower their charges for hauling farm products and assisted the farmers in other ways.

The drive for woman suffrage became strong after the Civil War. In 1869, Susan B. Anthony and Elizabeth Cady Stanton founded the National Woman Suffrage Association. The Territory of Wyoming gave women the right to vote the same year. Soon, a few states allowed women to vote, but only in local elections.

The Progressive Era. The outcry for reform increased sharply after 1890. Members of the clergy, social workers, and others studied life in the slums and reported on the awful living conditions there. Educators criticized the nation's school system. Increasingly, unskilled workers resorted to strikes in an attempt to gain concessions from their employers. Often, violence broke out between strikers and strikebreakers hired by the employers. Socialists and others who opposed the U.S. economic system of capitalism supported the strikers and gained a large following.

As public support for reform grew, so did the political influence of the reformers. In 1891, farmers and some labourers formed the People's, or Populist, Party. The Populists called for government action to help farmers and labourers. They gained a large following, and convinced many Democrats and Republicans to support reforms. See **Populism.**

Reformers won control of many city and some state governments. They also elected many people to Congress who favoured their views. In addition, the first three presidents elected after 1900—Theodore Roosevelt, William Howard Taft, and Woodrow Wilson—supported certain reform laws.

Local and state legislation. Reformers in local and state government passed many laws to help the poor. Such laws provided for tenement house inspection, playgrounds, and other improvements of life in the slums. Some reform governments expanded public education and forced employers to protect workers against fires and dangerous machinery in factories.

Federal legislation. Theodore Roosevelt, who became president in 1901, was a liberal Republican who called for a "square deal" for all Americans. Roosevelt became the first president to help labourers in a strike against employers. In 1902, the United Mine Workers struck for better wages and working conditions. Roosevelt asked the miners and the mine owners to settle their differences through arbitration, but the mine owners refused. Angered, the president threatened to have the army take over the mines. The owners gave in, and reached a compromise with the miners.

Republican William Howard Taft succeeded Roosevelt in 1909. Although a conservative, Taft helped further the cause of reform. In 1912, conservative Republicans backed Taft for their party's presidential nomination, and liberal Republicans supported Roosevelt. Taft won the nomination. The liberals then formed the Progressive, or "Bull Moose," Party and nominated Roosevelt for president. The Republican split enabled reform Democrat Woodrow Wilson to win the presidency.

The reform movement flourished under Wilson. The many reform measures passed during Wilson's presidency included the Underwood Tariff Act of 1913, which lowered a high tariff that protected American business from foreign competition.

For more details on this era of reform in the United States, see **Progressive movement.**

Foreign affairs

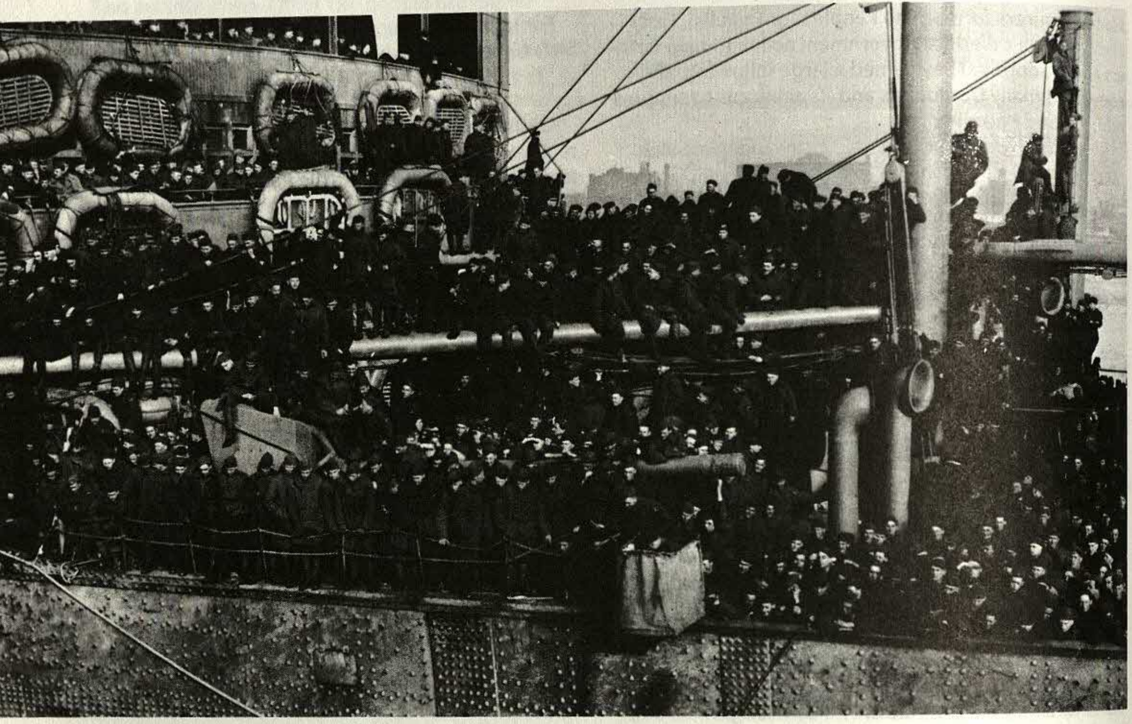
During the 1870's and 1880's, the United States paid relatively little attention to foreign affairs. In comparison to such European nations as France, Germany, and Great Britain, the United States was weak militarily and had little influence in international politics. During the 1890's and early 1900's, however, the United States developed into a world power and took a leading role in international affairs.

The Spanish-American War of 1898 marked a turning point in United States foreign policy. Spain ruled Cuba, Puerto Rico, the Philippines, and other overseas possessions during the 1890's. In the mid-1890's, Cubans revolted against their Spanish rulers. Many Americans demanded that the United States aid the rebels. On Feb. 15, 1898, the United States battleship *Maine* blew up off the coast of Havana, Cuba. No one was certain what caused the explosion, but many Americans blamed the Spaniards. On April 25, 1898, Congress declared war on Spain. The United States quickly defeated Spain, and the Treaty of Paris of Dec. 10, 1898, officially ended the war. Under the treaty, the United States received Guam, Puerto Rico, and the Philippines from Spain. Also in 1898, the United States annexed Hawaii. See **Spanish-American War; Hawaii.**

A world power. After he became president in 1901, Roosevelt expressed his foreign policy strategy with the slogan, "Speak Softly and Carry a Big Stick." Roosevelt meant that the country must back up its diplomatic efforts with military strength. In 1903, the president used a threat of force to gain the right to dig the Panama Canal (see **Panama Canal** [History]). America took over the finances of the Dominican Republic in 1905 to keep that country stable and free from European intervention. These and other actions showed that the United States had emerged as a world power.

War clouds in Europe. In 1914, long-standing problems among European nations led to the outbreak of World War I. Before long, events would drag the United States into war and test its new role as a world power.

The Progressive Era was marked by widespread demands for reform. Young socialist women, *left,* marched in a parade to demand better treatment of labourers. Such public demonstrations became common tactics among the reformers of the era.



World War I marked the first time the United States had fought a full-scale war on foreign territory. In 1917 and 1918, troopships carried about 2 million American fighting men across the Atlantic to Europe. The Americans helped the Allies defeat Germany.

A new place in the world

The United States stayed out of World War I until 1917. But then, German acts of aggression convinced most Americans of the need to join the war against Germany. For the first time in its history, the United States mobilized for a full-scale war on foreign territory.

The decade following World War I brought sweeping changes. The economy entered a period of spectacular—though uneven—growth. The booming economy and fast-paced life of the decade gave it the nickname of the *Roaring Twenties.* But the good times ended abruptly. In 1929, a stock market crash triggered the worst and longest depression in America's history.

World War I and the peace

The United States in the war. After World War I began in 1914, the United States repeatedly declared its neutrality. But increasingly, German acts of aggression brought America closer to joining the Allies. On May 7, 1915, a German submarine sank the British passenger ship *Lusitania.* The attack killed 1,198 people, including 128 Americans. Woodrow Wilson won reelection to the presidency in November 1916, using the slogan, "He Kept Us Out of War." But three months later, German submarines began sinking American merchant ships. This and other acts of aggression led the United States to declare war on Germany on April 6, 1917.

The American people rallied around their government's decision to go to war. Almost 2 million men volunteered for service, and about 3 million were conscripted. On the home front, the spirit of patriotism grew to a fever pitch. Americans willingly let the government take almost complete control of the economy for the good of the war effort.

World War I ended in an Allied victory with the signing of an armistice on Nov. 11, 1918. For a detailed account of the conflict, see **World War I.**

The peace conference and treaty. In 1919, the Allies held the Paris Peace Conference to draw up the terms of the peace with Germany. Wilson viewed the conference as an opportunity to establish lasting peace among nations. But the other leading Allies were chiefly interested in gaining territory and war payments from Germany. They adopted the Treaty of Versailles, which ignored almost all of Wilson's proposals.

The Treaty of Versailles did make provision for one of Wilson's proposals—an association of nations (later called the League of Nations) that would work to maintain peace. But the U.S. Senate failed to *ratify* (approve) the Treaty of Versailles. Thus, the Senate rejected U.S. participation in the League of Nations. See **Versailles, Treaty of; League of Nations.**

Life during the Roaring Twenties

In many ways, the 1920's marked the point at which the United States began developing into the modern society it is today.

The role of American women changed dramatically during the 1920's. The 19th Amendment to the Constitution, which became law on Aug. 26, 1920, gave women the right to vote in all elections. In addition, many new opportunities for education and careers opened up to women during the decade.

Social change and problems. Developments of the 1920's broadened the experiences of millions of Americans. The mass movement to cities meant more people could enjoy such activities as films, plays, and sporting events. Radio broadcasting began on a large scale. The car gave people a new way to get around. Cinemas became part of almost every city and town. The new role of women also changed society. Many women who found careers outside the home began thinking of themselves more as the equal of men, and less as housewives and mothers.

The modern trends of the 1920's brought about problems as well as benefits. Many Americans had trouble adjusting to the impersonal, fast-paced life of cities. This disorientation led to a rise in juvenile delinquency, crime, and other antisocial behaviour.

The 18th Amendment to the Constitution, called the prohibition amendment, caused unforeseen problems. It outlawed the sale of alcoholic beverages throughout the United States as of Jan. 16, 1920. Many otherwise law-abiding citizens considered prohibition a violation of their rights. They ignored the law and bought alcohol provided by underworld gangs. See **Prohibition.**

Looking backward. Not all Americans saw the changes brought about during the Roaring Twenties as being desirable. Many people yearned for a return to old American traditions, a trend that was reflected in many areas of life. In politics, it led to the return of a conservative federal government. In his successful presidential campaign of 1920, Warren G. Harding used the slogan "A Return to Normalcy." To many people, returning to "normalcy" meant ending the strong role of the federal government that marked the early 1900's. It also meant *isolation,* a turning away from the affairs of the outside world.

In religion, the trend toward tradition led to an upsurge of *revivalism* (emotional religious preaching). Revival meetings were most common in rural areas, but also spread to cities.

The Ku Klux Klan had died out in the 1870's, but a new Klan gained a large following during the 1920's. The new Klan had easy answers for Americans who were troubled by modern problems. It blamed the problems on "outsiders," including blacks, Jews, Roman Catholics, foreigners, and political radicals.

The economy—boom and bust

During the 1920's, the American economy soared to spectacular heights. Wartime government restrictions on business ended. Conservatives gained control of the federal government and adopted policies that aided big business.

But in spite of its growth and apparent strength, the economy was on shaky ground. Only one segment of the economy—manufacturing—prospered. Business executives grew rich, but farmers and labourers became worse off. Finally, in 1929, wild speculation led to a stock market crash.

Government and business. The American people grew tired of the federal government's involvement in society that marked the Progressive Era and the war years. They elected to Congress conservatives who promised to reduce the role of government. Also, all three presidents elected during the 1920's—Harding, Calvin Coolidge, and Herbert Hoover—were Republicans who agreed with the policy.

Technology enabled American manufacturers to develop new products, improve existing ones, and turn out goods much faster and more cheaply than ever before. Sales of such items as electric washing machines, refrigerators, and radios soared. But the manufacturing boom depended most heavily on the growth of the car industry. Before and during the 1920's, Henry Ford and others refined car manufacturing to a science. The cost of cars continued to drop and sales soared. In just 10 years between 1920 and 1930, the number of cars registered in the United States almost tripled, growing from about 8 million to 23 million.

Agriculture and labour did not share in the prosperity. A reduced market for farm goods in war-torn Europe and a slowdown in the U.S. population growth led to a decline in the demand for American farm products. Widespread poverty among farmers and labourers cut into the demand for manufactured goods, a contributing factor to the forthcoming depression.

Investments, speculation, and the crash. The economic growth of the 1920's led more Americans than ever to invest in the shares of corporations. The investments, in turn, provided companies with a flood of new capital for business expansion. As investors poured money into the stock market, the value of shares soared. The upsweep led to widespread speculation, which pushed the value of shares far beyond the level justified by earnings and dividends.

Such unsound investment practices led to the stock market crash of 1929. In late October, a decline in share prices set in. Panic selling followed, lowering share prices drastically and dragging investors to financial ruin. The stock market crash combined with the other weaknesses in the nation's economy to bring on the Great Depression of the 1930's.

For more details on the decade of the 1920's, see **Roaring Twenties.**

Important dates (1917-1929)

1917-1918	The United States fought in World War I.
1920	The U.S. Senate rejected American participation in the League of Nations.
1920	The U.S. Census showed that, for the first time, the majority of Americans lived in urban areas.
1920	The 18th Amendment to the Constitution, prohibiting the sale of alcohol nationwide, became effective; the 19th Amendment gave women complete suffrage.
1922	The government raised tariffs to the highest level ever.
1925	The Scopes Trial in Tennessee upheld the right of a state to ban the teaching of evolution in state schools.
c. 1925	The Golden Age of radio broadcasting began.
1927	Charles A. Lindbergh made the first solo flight across the Atlantic Ocean.
1927	*The Jazz Singer,* the first successful film with sound track, appeared.
1929	The stock market crash brought financial ruin to thousands of investors.

The Great Depression of the 1930's spread poverty throughout the United States. Hungry, unemployed Americans stood in long "bread lines" to receive food paid for by charitable donations. The hard times dragged on until 1942, after the United States entered World War II.

Depression and a world in conflict

The United States suffered through the Great Depression that followed the stock market crash of 1929 for more than 10 years. During the depression, millions of workers lost their jobs and large numbers of farmers were forced to abandon their farms. Poverty swept through the nation on a scale never before experienced.

The Great Depression was not limited to the United States. It struck almost every other country in the world. In some countries, the hard times helped bring to power dictators who promised to restore the economy. The dictators included Adolf Hitler in Germany and a group of military leaders in Japan. Once in power, both Hitler and the Japanese rulers began conquering neighbouring lands. Their actions led to World War II, the most destructive conflict in world history. The United States fought in the war from 1941 to 1945, and played a key role in defeating Germany and Japan.

Victory in World War II brought a spirit of great relief and joy to the United States. The postwar economy boomed. More people shared in the prosperity than ever before, creating a huge, well-to-do middle class. Even so, Americans still faced problems. Chief among them were the new threat of nuclear war, the growing strength of Communism, and discontent among Americans who did not share in the prosperity.

The Great Depression

The road to ruin. The stock market crash sent shock waves through the American financial community. Banks greatly curtailed their loans to businesses, and businesses then cut back on production. Millions of people lost their jobs because of the cutbacks. Spending then dwindled, and businesses suffered even more. Factories and shops shut down, causing even higher unemployment. Consumption of farm products declined, and farmers became worse off than ever. Thousands of banks failed and foreign trade decreased sharply. By the early 1930's, the nation's economy was paralysed.

The depression and the people. At the height of the depression in 1933, about 13 million Americans were out of work, and many others had only part-time jobs. Farm income declined so sharply that more than 750,000 farmers lost their land. The Dust Bowl, the result of a terrible drought on the western Great Plains, also wiped out many farmers (see **Dust Bowl**). Hundreds of thousands of people lost their life savings as a result of the bank failures.

Throughout the depression, many Americans went hungry. People stood in "bread lines" and went to "soup kitchens" to get food provided by charities. Often, two or more families lived crowded together in a small apartment. Some homeless people built shacks of tin and scraps of wood on waste ground.

Roosevelt, recovery, and reform. Early in the Great Depression, President Herbert Hoover promised that prosperity was "just around the corner." But the depression deepened as the election of 1932 approached. The Republicans supported Hoover for reelection. The Democrats chose Franklin Delano Roosevelt. In his campaign, Roosevelt promised government action to end the Great Depression and reforms to avoid future depressions. The people responded, and Roosevelt won a landslide victory.

Roosevelt's programme was called the *New Deal.* Its many provisions included public works projects to provide jobs, relief for farmers, assistance to manufacturing firms, and the regulation of banks.

Roosevelt's efforts to end the depression made him one of the most popular U.S. presidents. The voters elected him to four terms. No other president won election more than twice. Roosevelt's New Deal was a turning point in American history. It marked the start of a strong government role in the nation's economic affairs that has continued and grown to the present day. See **Great Depression; New Deal.**

The United States in World War II

World War II began on Sept. 1, 1939, when German troops overran Poland. France, Great Britain, and other nations (called the Allies) went to war against Germany. At first, America stayed out of the war. But on Dec. 7, 1941, Japanese planes bombed the U.S. military base at Pearl Harbor, Hawaii. The United States declared war on Japan on December 8, and three days later Germany and Italy—Germany's chief ally—declared war on the United States.

The war effort. The American people backed the war effort with fierce dedication. About 15 million American men served in the armed forces. About 338,000 women served in the armed forces. At home, factories were converted into defence plants where aeroplanes, ships, weapons, and other war supplies were made. The country had a shortage of civilian men, and so thousands of women worked in the defence plants. Even children took part in the war effort. Boys and girls collected used tin cans, old tyres, and other "junk" that could be recycled and used for war supplies.

Allied victory. On May 7, 1945, after a long, bitter struggle, the Allies forced the mighty German war machine to surrender. Vice President Harry S. Truman had become president upon Roosevelt's death about a month earlier. The Allies demanded Japan's surrender, but the Japanese continued to fight on. Truman then made one of the major decisions in history. He ordered the use of the atomic bomb, a weapon many times more destructive than any previous weapon. An American aeroplane dropped the first atomic bomb used in warfare on Hiroshima, Japan, on Aug. 6, 1945. A second atomic bomb was dropped on Nagasaki on August 9 (see **Nuclear weapon**). Japan formally surrendered on September 2, and the war was over. For more details, see **World War II.**

The threat of Communism

The United States and the Soviet Union both fought on the side of the Allies during World War II. But after the war, the two countries became bitter enemies. The Soviet Union, as a Communist country, opposed democracy. It helped Communists take control of most of the countries of Eastern Europe and also aided Communists who seized control of China.

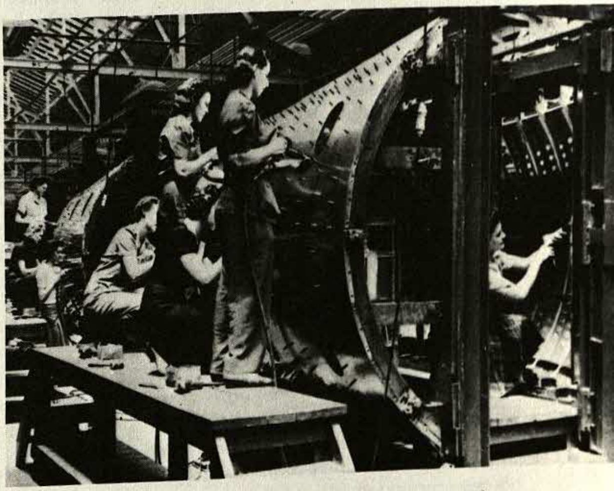
The Soviet Union and China then set out to spread Communism to other lands. The United States, as the world's most powerful democratic country, took on the role of defending non-Communist nations threatened by Communist take-over. The containment of Communism became the major goal of U.S. postwar foreign policy.

The Cold War and foreign policy. The postwar struggle between the American-led non-Communist nations and the Soviet Union and its Communist allies became known as the *Cold War.* The conflict was so named because it did not lead to fighting, or a "hot" war, on a major scale.

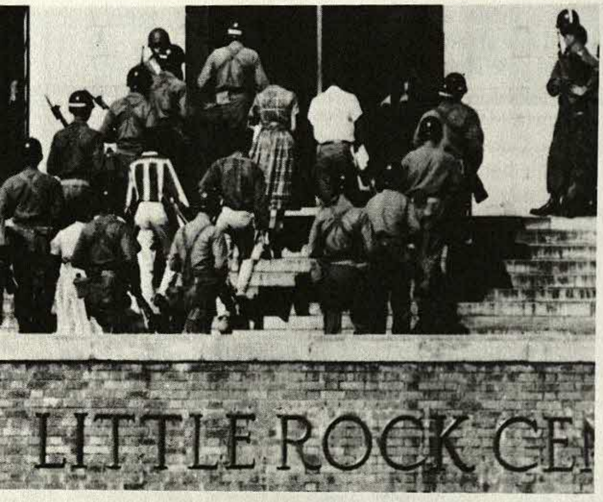
Both the United States and the Soviet Union built up arsenals of nuclear weapons. The nuclear weapons made each nation capable of destroying the other. The threat of nuclear war made both sides cautious. As a result, Cold War strategy emphasized threats of force, propaganda, and aid to weak nations. The United Na-

Important dates (1930-1959)

1930's	The United States suffered through the Great Depression.
1933	President Franklin D. Roosevelt began the New Deal programme to try to end the depression.
1941-1945	The United States fought in World War II.
1945	An American aeroplane dropped the first atomic bomb used in warfare on Hiroshima, Japan.
1945	The United States became a charter member of the United Nations (UN).
1947	President Truman announced the Truman Doctrine, which pledged American aid to nations threatened by Communism.
1950's	Television became part of most American homes.
1950	Senator Joseph R. McCarthy gained national fame by charging that Communists had infiltrated the federal government.
1950-1953	The United States fought in the Korean War.
1954	The Supreme Court ruled compulsory segregation in public schools unconstitutional.
1955	Martin Luther King, Jr., began organizing a movement to protest discrimination against blacks.
1957	The Soviet Union launched *Sputnik I*—the first space satellite—causing the United States to place more emphasis on space research.



World War II defence workers included many women. The women filled jobs vacated by men who entered the armed forces. They helped produce planes, ships, and weapons.



A civil rights law banning compulsory school segregation led to a dramatic incident in 1957. President Eisenhower sent troops to escort black students into an all-white Arkansas school.

tions (UN), founded in 1945, provided a forum where the nations could try to settle their Cold War disputes.

Truman and Dwight D. Eisenhower, the first two presidents of the Cold War era, pledged American military support to any nation threatened by Communism. Also, the United States provided billions of dollars to non-Communist nations. See **Cold War.**

The Korean War resulted from the Cold War friction. On June 25, 1950, troops from Communist North Korea, equipped by the Soviet Union, invaded South Korea. The UN called on member nations to help restore peace. Truman sent American troops to aid South Korea, and the UN sent a fighting force made up of troops from many nations. The war lasted for three years, ending in a truce on July 27, 1953. See **Korean War.**

Communism and internal friction. The spread of Communism caused deep divisions within the United States. Conservatives blamed the Roosevelt and Truman administrations for allowing the Communist postwar gains. They also claimed that Communists were infiltrating the American government. The charges led to widespread investigations of—and debate over—the extent of Communist influence in American government and society. Conservatives believed the investigations were needed to save the country from Communist control. Liberals charged the conservatives with conducting "witch hunts"; that is, trying to fix guilt on people without evidence. See **Hiss, Alger; McCarthy, Joseph R.**

Postwar society

After World War II, the United States entered the greatest period of economic growth in its history. Periods of *inflation* (rapidly rising prices) and *recession* (mild business slumps) occurred. But overall, prosperity spread to more Americans than ever before, resulting in major changes in American life. However, millions of Americans—including a high percentage of the nation's blacks—continued to live in poverty. The existence of poverty amid prosperity brought on a period of active social protest that has continued to the present day.

Prosperity returns. Military spending during World War II drew the United States out of the Great Depression. Major industries, such as car manufacturing and housing construction, had all but stopped during the war. After the war, these industries resumed production on a much larger scale than ever. Relatively new industries such as electronics, plastics, frozen foods, and jet aircraft became booming businesses.

The shortage of goods during the war and other factors combined to create a vast market for American products. A population boom increased the number of consumers. Between 1950 and 1960 alone, the population of the United States grew by about 28 million. Trade unions became stronger than ever, and gained high wages and other benefits for their members. Wage laws and other government regulations also helped give workers a greater share of the profits of business. These developments also meant that more Americans had more money to spend on goods.

A new life style resulted from the prosperity. After the war, millions of people needed, and were able to afford, new housing. Construction companies quickly built huge clusters of houses in suburbs around the nation's cities. Vast numbers of Americans moved from cities to suburbs. The suburbs attracted people for many reasons. They offered newer housing, more open space, and—usually—better schools than the inner cities.

A rise in car ownership accompanied the suburban growth. Increased car traffic led to the building of a nationwide network of motorways. The car and prosperity enabled more people than ever to take holidays. New motels, fast-service restaurants, and petrol stations sprang up to serve the tourists.

Prosperity and technological advances changed American life in other ways. Television—an experimental device before the war—became a feature of most American homes during the 1950's. This wonder of modern science brought scenes of the world into the American living room at the flick of a switch (see **Television** [History]). New appliances made house work easier. They included automatic washing machines, driers, dishwashers, and waste disposal units.

Poverty and discrimination. In spite of the general prosperity, millions of Americans still lived in poverty. The poor included members of all ethnic groups, but the plight of the nation's poor blacks seemed especially bleak. Ever since emancipation, blacks in both the North and South had faced discrimination in jobs, housing, education, and other areas. A lack of education and jobs made poverty among blacks widespread.

During the early 1900's, blacks, joined by many whites, had begun a movement to extend civil rights to blacks. The movement gained momentum after World War II. Efforts of civil rights leaders resulted in several Supreme Court decisions that attacked discrimination. In the best-known case, *Brown v. Board of Education of Topeka* (1954), the court ruled that compulsory segregation in state schools was illegal.

In spite of the gains, many civil rights leaders became dissatisfied with the slow progress of their movement. In 1955, Martin Luther King, Jr., a Baptist minister, began organizing demonstrations protesting against discrimination. Before long, the public protest would become a major tool of Americans seeking change.

A photograph of the earth taken by astronauts orbiting the moon, *above,* is an example of America's leading role in science and technology. But despite its many accomplishments, the nation today faces a variety of problems and challenges—just as it has throughout its history.

America since 1960

The period of American history since 1960 has been marked by a continuation of many postwar trends. For much of the period, the country's foreign policy remained focused on the containment of Communism. The economy continued to expand, despite recurring periods of inflation and recession. The movement of people from cities to suburbs continued steadily. The 1970 U.S. Census showed that, for the first time, more Americans lived in suburbs than in cities.

The country continued to be a leader in scientific and technological advancements. It made great strides in medicine that helped reduce human suffering, and its technological skill provided the means for a new and exciting field of exploration—outer space.

At the same time, events and new public attitudes brought dramatic social changes to the United States. The black civil rights movement grew in intensity in the 1960's. Many other groups—including American Indians, Mexican Americans, and women—also began demanding fuller rights. In the mid-1960's, many Americans began challenging U.S. foreign-policy decisions. Protesters of all kinds staged demonstrations to try to bring about change.

Crime and violence soared in the United States after 1960, and pollution threatened the environment. Concern over political corruption grew in the 1970's, and helped bring about the first resignation of an American president, Richard M. Nixon. The list of the nation's problems was long. But at the same time, most Americans maintained a deep pride in their country.

The 1960's

The civil rights movement. The black civil rights movement became the main domestic issue in the nation in the early 1960's. Increasingly, blacks—joined by whites—staged demonstrations to dramatize their demands for rights and equality. One of the highlights of the movement came on Aug. 28, 1963, when more than 200,000 people staged a *freedom march* called the March on Washington in Washington, D.C.

John F. Kennedy, who became president in 1961, urged Congress to pass legislation outlawing discrimination on the basis of race. Kennedy was killed by an assassin on Nov. 22, 1963, and Vice President Lyndon B. Johnson became president. Johnson, a former U.S. senator skilled in dealing with legislators, persuaded Congress to pass many major civil rights laws.

The Civil Rights Act of 1964 outlawed discrimination in employment, voter registration, and *public accommodations* (public facilities such as parks, public lavatories, and bus services). The Civil Rights Act of 1968 was designed to end discrimination in the sale and renting of housing. Congress, at Johnson's urging, also provided financial aid for the needy.

Urban unrest. In spite of government aid and a generally booming economy, poverty remained a major problem in America's central cities. Discontent among blacks in poor, decaying neighbourhoods grew. In the mid-1960's, blacks staged riots in the ghettos of Chicago, Cleveland, Detroit, Los Angeles, New York City, Newark, and other cities. Many blacks also rioted in 1968, following the assassination of Martin Luther King, Jr.

The number of such crimes as murder, robbery, and rape soared during the 1960's. The crime rate was especially high in the central cities but also increased rapidly elsewhere. Sociologists blamed such factors as the weakening of the family, poverty, mental illness, drug addiction, and a feeling of hopelessness and alienation.

The Vietnam War brought further turmoil in the 1960's. The war had begun in 1957 as a battle for control of South Vietnam between the non-Communist government and Communists. In the late 1950's and early 1960's, presidents Eisenhower and Kennedy sent military aid and advisers to support the South Vietnam government. Soon after Johnson became president, the Communists threatened to topple the government. Johnson responded to the threat by sending hundreds of thousands of American combat troops to help South Vietnam fight the Communists. By the mid-1960's, the United States was deeply involved in the Vietnam War.

A majority of Americans supported the war effort at first, but others bitterly opposed it. In the late 1960's, opposition to the war grew. The war critics argued that the United States had no right to interfere in Vietnamese affairs. Throughout the nation, university students and others staged antiwar demonstrations.

Johnson, discouraged by the criticism of his Vietnam policy, refused to run for reelection in 1968. The people elected Richard Nixon, partly because he pledged to end U.S. involvement in the war. But as the 1960's ended, U.S. troops were still in Vietnam. (See **Vietnam War.**)

Space exploration by American astronauts provided a high note during the troubled 1960's. On May 5, 1961, astronaut Alan Shepard became the first American in space. In the 1960's, the United States and the Soviet Union matched their technological skills in a race to land the first person on the moon. Then, on July 20, 1969, millions watched on TV as U.S. astronaut Neil Armstrong became the first person to set foot on the moon's surface. See **Space travel.**

WE MARCH
JOBS FOR ALL NOW!
WE DEMAND VOTING RIGHTS NOW!
WE MARCH FOR JOBS FOR ALL NOW!
WE DEMAND DECENT HOUSING NOW!
UAW SAYS END SEGREGATED RULES IN PUBLIC SCHOOLS
I.U.E.

Civil rights for blacks became a major national issue during the 1960's. About 200,000 people, including both blacks and whites, took part in a march on Washington, D.C., in 1963.

The 1970's

Political scandals rocked the United States in the 1970's. In 1972, campaign workers for President Nixon's reelection committed a burglary at the Democratic political headquarters in the Watergate building complex in Washington, D.C. Nixon was later charged with covering up the burglary and with other illegal activities. Evidence against Nixon mounted until it became apparent that the House of Representatives would impeach him and that the Senate would remove him from office. On Aug. 9, 1974, he resigned as president. He was the only U.S. president ever to resign. Vice President Gerald Ford succeeded Nixon as president. He pardoned Nixon for all federal crimes the former president might have committed while in office. See **Watergate.**

The drive for equality that began with blacks spread to other minority groups. American Indians, Mexican Americans, and others organized active movements aimed at gaining equality. In addition, large numbers of women began calling for an end to discrimination based on sex. Their activities became known as the Women's Liberation Movement. The movement helped bring about greater equality for women in employment and other areas (see **Women's movement**).

Pollution and conservation. As the country's industry and population grew, so did the pollution of its environment. Smoke from factories and fumes from cars filled the air with dangerous gases. Wastes from factories and other sources polluted many rivers and lakes. Many Americans began demanding government action to control environmental pollution. In response, the government passed many antipollution laws. But the problem remains severe.

The need to conserve energy became another pressing problem for the country. America's many industries and other energy users placed a drain on the nation's limited energy supply. The energy crisis was highlighted in 1973, when a fuel shortage reduced the supply of oil for heating homes and petrol. In 1979, another petrol shortage hit parts of the nation.

Foreign affairs. The chief U.S. foreign policies in the 1970's were aimed at ending the Vietnam War and easing world tensions. Nixon removed America's last ground forces from Vietnam in 1973. Two years later, South Vietnam fell to the Communists.

Important dates (Since 1960)

1961	Astronaut Alan Shepard, Jr., became the first American in space.
1962	The Soviet Union removed missiles from Cuba, ending a threat of war with the United States.
1964	Congress passed a flood of important civil rights laws.
1965	United States combat troops stationed in South Vietnam entered the Vietnam War.
1969	Astronaut Neil Armstrong became the first person to set foot on the moon.
1973	The United States removed its last ground troops from Vietnam. The war ended in 1975.
1974	Richard Nixon became the first American president to resign from office.
1976	The United States celebrated its bicentennial.
1991	U.S. forces helped defeat Iraq in the Persian Gulf War.

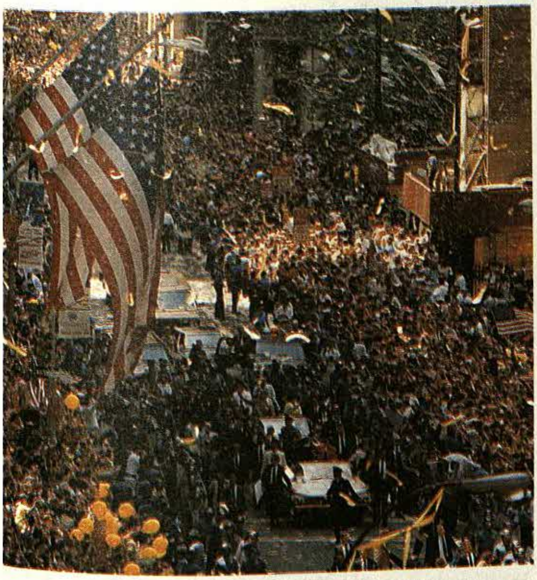
Nixon also took steps to reduce tensions between the United States and China and the Soviet Union, the two leading Communist powers. In 1972, he visited these countries. Nixon reached agreements with the Chinese and Soviet leaders that seemed to improve U.S. relations with the Communist powers.

Jimmy Carter, elected president in 1976, worked to end a long-standing dispute with Panama over control of the Panama Canal. In 1978, the U.S. Senate approved a treaty negotiated by the Carter administration that will give Panama control of the canal on Dec. 31, 1999. Another treaty will give the United States the right to defend the canal's neutrality.

Carter also tried to improve U.S. relations with China and the Soviet Union. In early 1979, the United States and China established normal diplomatic relations. Relations between the United States and the Soviet Union declined sharply when Soviet troops invaded Afghanistan in late 1979.

Troubles in the Middle East, a region that is important to U.S. security, also challenged the United States. In 1978, Carter arranged meetings that led to a peace agreement between Egypt and Israel. In Iran, a revolution overthrew the government of the *shah* (ruler) in February 1979. In November, revolutionaries took over the U.S. Embassy in Teheran, Iran's capital, to protest against U.S. aid to the deposed shah. The revolutionaries held a group of U.S. citizens as hostages, and they demanded that the United States return the shah to Iran for trial. The U.S. government refused to do so. The shah died in Egypt in July 1980, but the revolutionaries held the hostages until January 1981.

Domestic problems. The worst period of inflation in American history began in the late 1960's. In the early 1970's, a severe recession led to high unemployment. The economy recovered in the mid-1970's, when the recession ended and the rate of inflation slowed down. Inflation began to rise sharply again in the late 1970's.



Victory in the Persian Gulf War was celebrated in a parade, *above,* in New York City.

Since 1980

The economy became the main concern of President Ronald Reagan, who succeeded Carter in 1981. Reagan wanted to slash the inflation rate and balance the federal budget. Inflation slowed again, largely due to a recession that began in mid-1981.

To stimulate the economy, Reagan proposed the largest federal income tax reduction in U.S. history. Congress approved the tax-cut programme, which scheduled cuts in 1981, 1982, and 1983. But high interest rates continued to limit spending by consumers and investment by business. The recession worsened, and the nation experienced its highest rate of unemployment since 1941. An economic recovery began in 1983, and unemployment fell sharply. Inflation remained low. But the tax cuts and heavy government defence spending helped bring about record deficits in the federal budget.

During the 1980's, the economy of the United States became more integrated with those of other nations. The country's economic partners included not only many European nations, as in the past, but also many Asian nations, such as Japan, Singapore, South Korea, Taiwan, and Thailand. In 1989, a trade agreement between the United States and Canada began reducing trade barriers between the two countries. As a result of these changes, markets for United States goods and services continued to expand during the 1980's.

Important changes also took place within the U.S. economy. Several major industries of the early 1900's lost importance. For example, mining, steel production, and car manufacturing played much smaller roles in the nation's economy. In contrast, service industries and such industries as biotechnology, computers, and communications expanded during the 1980's.

Foreign affairs. In foreign affairs, the United States became increasingly concerned with unrest in Central America. Much fighting took place between rebels and government troops in Nicaragua and El Salvador. Cuba and the Soviet Union gave aid to the government of Nicaragua and rebels in El Salvador. The United States supported a rebellion against the Nicaraguan government and provided military aid to El Salvador's government. Congress banned military aid to the Nicaraguan rebels, called the *contras,* during the mid-1980's.

In 1986, two secret operations of the Reagan administration were revealed and became known as the *Iran-contra affair.* One operation involved sales of U.S. weapons to Iran, a suspected supporter of international terrorism. The other operation included use of profits from the arms sales to aid the contras, even though such aid was at that time prohibited. The United States suffered international criticism for both policies.

The United States launched a huge military build-up during the early 1980's. It also began to carry out a programme to supply its allies in Western Europe with hundreds of nuclear missiles. U.S.-Soviet relations improved in 1987 when Reagan and Soviet leader Mikhail Gorbachev signed a treaty that called for the dismantling of all ground-launched U.S. and Soviet nuclear missiles with ranges of 500 to 5,500 kilometres. The treaty, which went into effect in 1988, helped ease fear of nuclear war. Tension was further reduced in 1988 when the Soviet Union began withdrawing from Afghanistan.

Recent developments

In 1989, George Bush succeeded Ronald Reagan as president. Bush had to deal with the worst crisis in the savings and loan industry since the Great Depression of the 1930's. Savings and loan institutions provide loans for building or buying homes. In the 1980's, more than 1,000 of these institutions failed. Their problems resulted from several factors, including mismanagement, fraud, and customers' nonpayment of loans.

In foreign affairs, the United States continued to be concerned with unrest in Central America. In December 1989, Bush ordered troops into Panama. They overthrew the dictator General Manuel Noriega and arrested him on drugs charges.

In August 1990, Iraq invaded and took over Kuwait, a small, oil-rich country between Iraq and Saudi Arabia. The United States contributed tens of thousands of troops to the huge build-up of Allied forces in Saudi Arabia and the Gulf area that followed Iraq's act of aggression. In November, the United Nations Security Council authorized the United States and other UN members to expel Iraqi troops from Kuwait by force if Iraq failed to withdraw by Jan. 15, 1991. When Iraq failed to comply with this UN deadline, U.S. and allied forces began bombing Iraqi military targets on January 17. In the ensuing war, UN coalition forces completely overwhelmed Iraqi troops, destroying their air power and cutting off their supply lines. See **Persian Gulf War.**

At a summit meeting in Moscow in July 1991, Bush and Soviet leader Mikhail Gorbachev signed the Strategic Arms Reduction Treaty (START), the first treaty to call for a reduction in the number of long-range nuclear weapons.

In the early 1990's Americans became increasingly frustrated over signs of growing ethnic conflict, crime, and poverty, especially in the nation's cities. In 1992, rioting broke out in Los Angeles and several other U.S. cities after a jury chose not to convict four white Los Angeles police officers of assaulting a black motorist. See **Los Angeles** (Recent developments).

In January 1993, Bush and Russian President Boris Yeltsin signed a second START agreement. The new treaty cut the total number of U.S. and former Soviet long-range nuclear weapons to less than half the number proposed by START 1. Bill Clinton, who defeated Bush in the 1992 U.S. presidential election, supported further U.S. cooperation with Russia and the other former Soviet republics. See **Bush, George; Clinton, Bill.**

When Clinton succeeded President Bush in 1993, he focused on domestic problems. Clinton pushed through legislation to reduce the federal budget deficit by a combination of tax increases and spending reductions. Clinton also worked on plans for health care reform. He submitted a plan to Congress designed to provide health care for all while controlling costs.

Related articles in *World Book.* See the articles on each president and the *History* section of the articles on each state. Other related articles include:

Historical periods and wars

American Civil War
American Revolution
Cold War
Colonial life in America
Exploration
Great Depression
Indian wars
Industrial Revolution
Korean War
Mexican War
Progressive movement
Reconstruction
Seven Years' War
Spanish-American War
Vietnam War
War of 1812
Western frontier life
Westward movement
World War I
World War II

Other related articles

American literature
Articles of Confederation
Atlantic Charter
Continental Congress
Declaration of Independence
Flag
Gettysburg Address
Immigration
Indian, American
Mayflower Compact
Monroe Doctrine
Northwest Ordinance
Slavery
United States
United States, Government of the
World, History of the

Outline

I. America before colonial times
  A. The first Americans
  B. European discovery
  C. Exploration and early settlement
  D. The land that became the United States
II. The colonial heritage (1607-1753)
  A. The thirteen colonies
  B. Life in colonial America
III. The movement for independence (1754-1783)
  A. Background to the revolution
  B. The road to independence
IV. Forming a new nation (1784-1819)
  A. Establishing a government
  B. Early problems and politics
  C. Jeffersonian democracy
  D. The War of 1812
  E. Growing nationalism
V. Expansion (1820-1849)
  A. America moves west
  B. Politics and the "common man"
  C. Social reform
VI. The irrepressible conflict (1850-1869)
  A. Debate and compromise
  B. Nationwide turmoil
  C. The Civil War and Reconstruction
VII. Industrialization and reform (1870-1916)
  A. The rise of big business
  B. The South and the West
  C. Life during the industrial era
  D. Reform
  E. Foreign affairs
VIII. A new place in the world (1917-1929)
  A. World War I and the peace
  B. Life during the Roaring Twenties
  C. The economy—boom and bust
IX. Depression and a world in conflict (1930-1959)
  A. The Great Depression
  B. The United States in World War II
  C. The threat of Communism
  D. Postwar society
X. America since 1960
  A. The 1960's
  B. The 1970's
  C. The Reagan years
  D. Recent developments

Questions

What were the 13 original colonies?
What was the Stamp Act? The Sugar Act?
When was the Declaration of Independence adopted?
Why did the early American leaders write the Constitution?
What was the doctrine of manifest destiny?
How did westward expansion help America's economic growth?
What was the nullification crisis?
What were some effects of the American Civil War?
What was the Louisiana Purchase?
What was prohibition?

Universal Copyright Convention. See Copyright (International conventions).

Universal Declaration of Human Rights. See **Human Rights, Universal Declaration of.**

Universal joint. See **Transmission** (The drive shaft).

Universal language. Language is the main means of communication between peoples. But so many different languages have developed that language has often been a barrier rather than an aid to understanding among peoples. For many years, people have dreamed of setting up an international, universal language which all people could speak and understand.

The arguments in favour of a universal language are simple and obvious. If all peoples spoke the same tongue, cultural and economic ties might be much closer, and good will might increase between countries. However, many people consider the promoters of universal languages to be impractical idealists.

René Descartes, a French philosopher, is believed to have originated the idea of a universal language in the 1600's. John Comenius, a Bohemian bishop and educator of the same period, also suggested the idea. More than 200 other languages designed for universal use have been invented since that time.

Volapük was the earliest of these languages to gain much success. The name of the language comes from two of its words meaning *world* and *speak.* Johann Martin Schleyer, a German priest, invented the suggested language in 1879. Later, Idiom Neutral, a simplified form of Volapük, was suggested. Other proposed languages include Esperanto; a revised form of Esperanto called Ido; Interglossa; Interlingua; Novial; and Spelin. However, only Esperanto is used widely.

English is close to being an international language. During the last several hundred years, it has become a second language in many countries as a result of economic, political, and social developments. To promote such widespread use, scholars invented Basic English. This simplified form of English has a vocabulary of about 850 common English words.

See also **Esperanto; Interlingua; Volapük; Language** (Universal languages).

Universal Postal Union. See **Postal Union, Universal.**

Universal Product Code. See **Bar coding.**

Universal set. See **Set theory** (Kinds of sets).

Universe consists of all matter, light, and other forms of radiation and energy. It consists of everything that exists anywhere in space and time.

The universe includes the earth and everything on it. It also includes everything in the solar system. All the stars, of which the sun is one, are part of the universe. The sun is one of more than 100 billion stars grouped in a giant spiral galaxy called the Milky Way Galaxy. The Milky Way Galaxy is about 100,000 *light-years* across. A light-year is the distance that light travels in a year—about 9.46 trillion kilometres.

Studies of distant space with optical and radio telescopes indicate that there may be about 100 billion galaxies in the visible universe. Galaxies tend to be grouped together into *clusters,* and some clusters appear to be grouped into *superclusters.*

Size of the universe. No one knows whether the universe is finite or infinite in size. The bright, unusual objects called *quasars* are the most distant objects in the universe found to date. Quasars may be as far away as 16 billion light-years from the earth.

Scientists cannot determine the distance to a quasar by studying its brightness. But they can determine this distance by studying the quasar's *red shift.* When a quasar—or any object that gives off light—moves away from an observer, the observer sees the light at *wavelengths* longer than those that would be seen by an observer who is moving with the object. (Wavelength is the distance between successive wave crests.) The observed change in wavelength is called a *red shift* (see **Red shift**). The amount of red shift depends upon the speed at which the object moves away from the observer. All but the nearest galaxies and all quasars are observed to have red shifts. Astronomers interpret the measured amounts of red shift as evidence that the universe is expanding, with every part of the universe moving away from every other part. This is one of the fundamental observations that must be explained by a successful theory of the universe.

Changing views of the universe. In ancient times, people thought the universe consisted only of their own locality, distant places of which they had heard, and the sun, moon, planets, and stars. They thought of the heavenly bodies as gods and spirits.

The Polish astronomer Nicolaus Copernicus suggested in 1543 that the earth is like the other planets and that they all revolve around the sun. Later astronomers showed that the sun is a typical star, and that stars visible to the unaided eye are many light-years away.

The development of the telescope, the photographic plate, and the *spectroscope* (an instrument that analyses light) led to a great expansion of astronomical knowledge. Astronomers then discovered that the sun is in the Milky Way. About 1920, they realized that many of the fuzzy patches of light called *nebulae,* appearing to lie among the stars of the Milky Way, are actually other galaxies. The discovery of the red shift in distant galaxies led to the theory of the expanding universe. This discovery also formed one of the bases of *cosmology,* the study of the behaviour of the universe.

Cosmological theories. Most cosmological theories are based on an idea called the *cosmological principle.* According to this idea, at any given time, any part of the universe is like any other part having the same age. Albert Einstein's theory of general relativity also forms part of the basis for theories about the behaviour of the universe. Einstein's theory, in turn, is based on two principles: (1) that no signal can travel faster than the speed of light, and (2) that the laws of physics are the same everywhere in the universe.

These theories lead to *models* (mathematical descriptions) that represent the universe as expanding, contracting, *oscillating* (expanding, then contracting), or *static* (neither expanding nor contracting). From observing the red shift in distant galaxies, scientists conclude the universe is currently expanding. But the overall behaviour of the universe in the future will depend on the present density of matter in the universe.

Suppose that all the matter detected to date in the universe is all that exists. There would be an average of only about one atom of hydrogen—the most abundant chemical element in the universe—in each 7.6 cubic metres of space. Under these conditions, the universe would be *open.* According to Einstein's theory, an open universe has an infinite volume and an infinite number of hydrogen atoms. The universe would continue to expand indefinitely and would approach zero density at an infinite time in the future. In the far future, only galaxies in the local supercluster would still be nearby. All other galaxies would have *receded* (moved back) to great distances. Eventually, all the stars would have exhausted all the energy that makes them shine, so they would be dark.

On the other hand, large amounts of matter may exist in space in some form that has not yet been detected—called *dark matter.* If the average density of matter in space were as much as 100 atoms of hydrogen in each 7.6 cubic metres, the universe would be *closed.* According to Einstein's theory, a closed universe has a finite volume and a finite number of hydrogen atoms. At some time in the future, perhaps 20 billion to 40 billion years, the expansion would stop. The galaxies would start to come together again, and matter would approach infinite density. This collapse might be followed by another period of expansion, and so on without limit.

Some scientists have suggested theories about the universe that are based on quite different ideas. For example, the *steady state* theory is based on the belief that any part of the universe is like all other parts at all times. According to this theory, matter is continuously created and formed into new galaxies that replace those which have receded to infinite distances. Other scientists believe that Einstein's theory of general relativity is incomplete. They have suggested, for example, that early in its evolution the universe underwent a period of rapid expansion called *inflation.*

No one knows which, if any, of the theories may prove to be correct. Scientists must wait until the fields of observational astronomy and theoretical physics develop further. Information still needed includes the average density of matter in space, the age of the oldest stars, the behaviour of red shifts at very large distances, and whether or not Einstein's theory is correct.

Related articles in *World Book* include:

Astronomy
Cosmology
Earth
Galaxy
Quasar
Relativity
Solar system
World

University. The term *higher education* refers to learning institutions that students can attend after they have finished secondary school. The university is the best-known kind of higher education institution. Other kinds bear such titles as college, institute, academy, polytechnic, or higher school. However, these other titles can be confusing, since they have other meanings in some countries. For example, in most countries the word *college* means a higher learning institution, while in nations with a British or Spanish tradition, *college* (*colegio* in Spanish) may also mean a private secondary school. Similarly, *academy* may also refer to a higher education institution or to a secondary school.

Universities and other education institutions

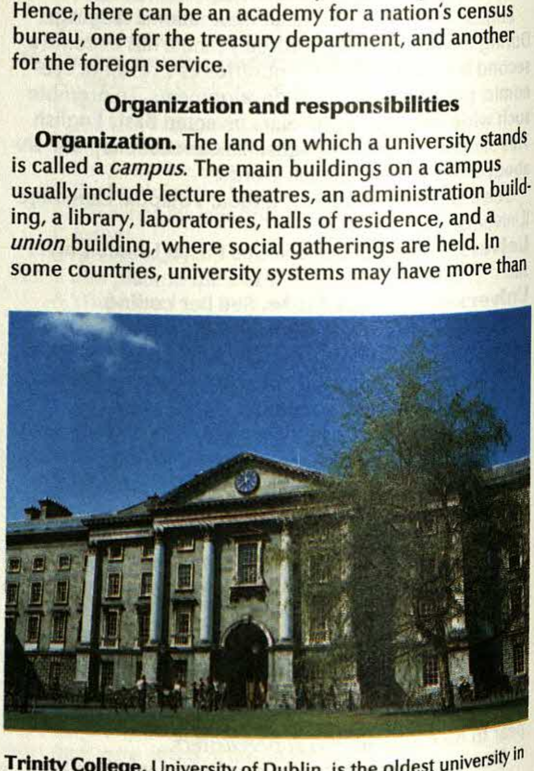
This article discusses higher education at universities. It explains how universities are different from some other institutions of higher education. It then covers universities' role and organization, how students are selected and taught, and how they can gain qualifications called *degrees.*

The usual way universities differ from other kinds of higher education institutions is in the wider range of subject matter universities offer. A typical university provides opportunities for students to specialize in fields of science (physics, chemistry, geology, biology, astronomy), social science (anthropology, psychology, sociology, economics), the humanities (history, philosophy, literature, languages), the creative arts (painting, music, dance, drama), and more. In addition, universities prepare students to enter particular occupations—to become architects, engineers, doctors, teachers, lawyers, agricultural experts, accountants, business administrators, and the like.

In contrast to universities, the other popular kinds of higher learning organizations (institutes, colleges, academies) usually focus on one or two special fields of learning. Thus an institute of technology specializes in science and engineering, and a college of agriculture teaches scientific methods of farming, fishing, and animal care. A teachers' college prepares classroom instructors, school administrators, school counsellors, and specialists who help pupils with learning difficulties. An art academy offers studies in drawing, painting, sculpture, photography, print making, textile design, and other visual arts. A music academy teaches students the history of music, how to sing and play instruments, and how to compose music. A military academy prepares army, navy, or air force officers. Government departments often sponsor an academy for training experts in the field of work the departments perform. Hence, there can be an academy for a nation's census bureau, one for the treasury department, and another for the foreign service.

Organization and responsibilities

Organization. The land on which a university stands is called a *campus.* The main buildings on a campus usually include lecture theatres, an administration building, a library, laboratories, halls of residence, and a *union* building, where social gatherings are held. In some countries, university systems may have more than



Trinity College, University of Dublin, is the oldest university in Ireland. It was founded in 1592.

King Saud University, in Riyadh, was one of Saudi Arabia's first institutions of higher learning. Founded in 1957 as Riyadh University, it was renamed in 1982. Today, King Saud University has more than 30,000 undergraduate students.

one campus. The California State University system in the United States, for example, includes 19 universities and colleges.

The *student body* of a university is divided into graduates and undergraduates. *Graduates* have already received their bachelor's degree and are working for a master's or doctor's degree. *Undergraduates* are studying for their bachelor's degree.

The teaching staff of a university is divided into *departments.* Each department deals with one general course of study, such as English, mathematics, or physics. Each department is headed by a *dean* or *chairman,* who is usually a professor. Under the dean are other professors, *associate professors* or *readers,* and *lecturers.* Some university departments include research workers who do not teach.

Finance. University finance varies from country to country. In Great Britain, for example, the Universities' Funding Council assesses the overall needs of British universities. It negotiates with the central government a grant from public funds based on its estimate. The committee shares out this sum among the universities. In other countries, private colleges depend primarily on student fees, endowments, and gifts for their operating income. Public institutions may also have these sources, but depend mainly on state and local taxes for their funds.

Students may receive grants from the government or local education authorities to cover tuition fees and living expenses. Some students receive scholarships from universities, the government, or other institutions. In some countries, students may obtain loans to cover the costs. They may also help support themselves by taking part-time jobs while attending university, or working during holidays.

Responsibilities. In most countries, universities are assigned three major tasks—teaching, creating new knowledge, and public service.

The teaching role is aimed at making sure the world's important knowledge is passed from one generation to the next. Teaching is also expected to prepare people to succeed in occupations that require high-level knowledge and skills. Therefore, teaching is the main job of most higher education institutions.

Another major responsibility of universities is that of *research*—making new discoveries and creating new knowledge. In science and technology, many inventions are the result of the creative ideas of university professors and their advanced students. For example, progress in space travel, electronic computers, laser-beam surgery, and atomic energy have depended heavily on the expertise of university faculty members. Most archaeologists who explore the ruins of ancient cities, historians who reveal events of the past, and psychologists who develop new ways of treating mental disorders are on university staffs. Symphonies may be composed by music professors, and insights into political events are offered by political science professors.

Although the task of creating new knowledge falls heavily on institutions of higher learning, most members of staff do little or no research. There are several reasons. In many institutions, the instructors' hours are nearly all taken up with teaching, leaving little or no time for creative work. Furthermore, many forms of research require large amounts of money to support staff and resources, and such funds are often not available. In addition, not all university teachers have the interest or skill needed to make new discoveries.

Although only a small percentage of higher education faculty members create new knowledge in every country, a lack of research and creative activity is most obvious in countries of Asia, Africa, South America, and the Pacific islands that were once held as colonies of European and North American nations. When those territories were colonies, the local people were given very few opportunities to attend a university. After winning their political freedom (mostly in the 1950's, 1960's, or 1970's), they lacked enough well-trained professors to operate their new universities adequately. Furthermore, members of staff usually have so many students to teach that there is no time left for research. As a result, most of the world's research and creative work in recent years has come from institutions in Europe and North America and from those in several other industrial nations, including Australia, Japan, and New Zealand.

The third major responsibility of universities is to provide service to the public. They are expected to help solve immediate problems faced in their own communities. Examples are air and water pollution, drug use by teenagers, heavy motor car traffic, mental illness, inadequate housing, and food shortages, and they may deal with many other problems. In certain countries—especially in the developing countries of Asia, Africa, and South America—the public-service role of universities is often far more important than research. Developing nations, in particular, need the immediate help of universities to help solve pressing problems.

Selecting students

No country offers openings in universities sufficient for all the students who would like to attend. Furthermore, university officials want to make sure that those students who do enrol are qualified and prepared to learn what is taught. Therefore, every standard academic institution has entrance requirements.

One of the most common requirements is that a student successfully completes secondary school. It is also usually necessary to show that they studied a particular selection of subjects during their secondary-school years. For example, the required pattern of studies might include a specified number of classes in mathematics, in literature, in foreign languages, in science, and in history. The pattern of secondary-school studies may differ, moreover, for students who wish to enter a university's science division from that for those who wish to study fine arts, music, history, or languages. Secondary-school students are often advised to look ahead to the kind of higher education speciality they would like to pursue so they can meet special requirements for entrance into a programme for a given speciality.

In countries that have a school-leaving examination at the close of secondary education, universities often use a student's examination results for deciding whether that individual should be admitted to their institution. In other nations, either the university itself or a nationwide testing organization gives a special entrance examination to assess the ability of applicants to succeed in higher education. Universities also ask for letters of recommendation from people who have known the student in secondary school. Such letters are expected to tell if the student has been hard working, honest, friendly, and likely to make intelligent decisions.

Teaching methods

By far the most common teaching method used in universities in all countries is the nonillustrated lecture. An instructor standing in front of a large classroom of students either talks spontaneously or reads aloud from notes. Occasionally, the instructor may write on the blackboard in front of the classroom. The students are expected to make notes and master, if not memorize, what they have heard in the lecture. The popularity of the **lecture** method derives less from its proven efficiency than from the ease with which it can be carried out and from tradition. Each new generation of instructors tends to teach in the same manner as they were taught—by lectures.

In recent decades, a variety of newer techniques have been adopted. Instructors have tried either to improve the traditional lecture or to replace it with methods that make students *active* learners rather than *passive* listeners. Among the devices that provide visual illustrations to clarify the content of a lecture are charts, maps, overhead projectors, slide shows, films, videotapes, and enlarged computer displays. *Seminars,* or discussions, often based on selected readings, provide opportunities for students to exchange views with instructors and with one another. Tutors may guide students in their studies and meet them individually to review the students' progress.

Many universities endeavour to increase opportunities for students to apply what they learn to real-life situations, so that students' experiences are not limited to memorizing formulas and listening to lectures in the

Private study is an important part of most university courses. Many students do their private study in a university library.

Seminars are discussions between a group of students and a *tutor* (teacher). They help learning and understanding.

classroom. Science departments traditionally have fostered such applications by assigning work in chemistry and physics laboratories and by field trips to geology and biology sites. Professors in the social sciences and humanities have also sought to increase the practical nature of their students' studies.

Open universities

In recent years a new form of higher education has been the *open university.* The word *open* in this case usually means there are no formal entrance requirements. Anyone can try. The institution is also open in the sense that it does not require that students gather on the same campus in order to attend classes. Instruction is offered by means of lessons sent through the mail or broadcast over radio and television. Students may occasionally meet at a central location to engage in discussions or take tests. In effect, learners study in their own homes and at their own pace.

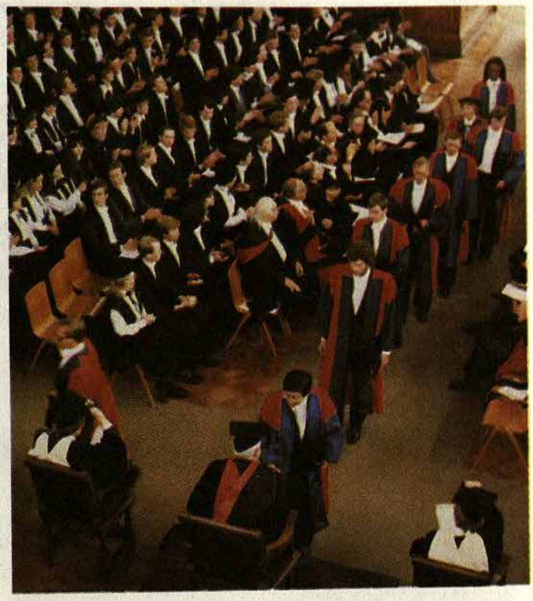
The first open university of modern times was started in Great Britain in 1971 with nearly 24,000 students. Within a few years the annual enrolment had increased to 70,000. Open universities modelled on the British version have been set up in various nations. India's Indira Gandhi National Open University began in 1985 and within four years enrolled more than 54,000 students. For instruction, India's students rely on printed materials and twice-monthly visits to one of 130 regional study centres, most of which are situated in existing educational institutions. In 1990, the Soviet Union's first open university began with 15,000 students. Several dozen other countries have adopted the open-university pattern, among them Canada, Indonesia, Israel, the Netherlands, and South Africa.

Degrees

An important goal for most students who enter higher education is to earn a degree: that is, to receive a diploma or certificate indicating command of particular skills and knowledge. The most common pattern of degrees consists of three ranks that are usually designated the bachelor, master, and doctoral levels.

To earn a *bachelor's* degree, students on the initial undergraduate level are required to engage in full-time study for three or more years, depending on the academic tradition of the country in which the university is located. In Great Britain and India, the length of the course is usually three years; and in the United States, four years. In Australia and Malaysia, it varies from three to six years, depending on the subject matter and the university. Typically, a *master's* degree is earned by one or two further years of study after the bachelor's degree. The *doctor's* degree requires an additional two to five years.

All three of these degrees are said to be *earned,* because people receiving them have mastered a specified body of knowledge. Universities also occasionally present someone with an *unearned* degree. Such is the case of an *honorary* doctor's degree, designated by the Latin term *doctor honoris causa.* That degree may be presented to people who have not completed the institution's academic requirements but have distinguished themselves in some aspect of public service, the arts, business, athletics, or other activities.



Graduation is a dignified and colourful ceremony at the end of undergraduate study. The *chancellor* (university head) or vice chancellor admits each student to his or her degree.

History

When and where universities first began is a matter of considerable debate. In ancient Greece, such famous teachers as Socrates and Aristotle gave instruction in philosophy and science, but their teaching was not within a university setting. In those days, students did not have to pass entrance examinations or attend regularly scheduled classes, nor did they receive academic degrees. Likewise, in early India, Hindu scholars taught religious lore, but their tutorial approach could not be considered university instruction in the present-day sense.

Although early forms of advanced education exerted some minor influence over the nature of present-day education, the direct ancestors of modern universities were institutions that arose in Europe in the Middle Ages. The earliest universities were not founded as complete institutions. They grew gradually as collections of individual schools, and the conditions and dates of their beginnings remain unclear. The most prominent of the early centres were the University of Bologna in Italy, which came into existence about 1100, and the University of Paris, which developed in the late 1100's. Each evolved as a merging of separate colleges.

The original subjects taught were the seven *liberal arts*—Latin grammar, rhetoric (speaking and writing well in Latin), dialectic (reasoning skills), arithmetic (using Roman numbers), geometry, astronomy, and music. Such programmes were expanded when the work of Muslims in the Middle East, North Africa, and Spain brought long-lost Greek and Roman scholarship to the attention of European academicians. The efficient Arabic number system was substituted for Roman numerals, a clumsy system that had made computation slow and difficult. Among the Islamic institutions that contributed to

Harvard University, founded in 1636, is the oldest university in the United States. This engraving dates from the 1770's. It shows Harvard College Yard, the centre of the original college.

this intellectual renaissance was Al-Azhar University in Cairo, Egypt, founded more than 1,000 years ago and still operating today.

The University of Paris was the model on which Oxford and Cambridge universities, in England, were fashioned. At both Oxford and Cambridge, students at first lived wherever they pleased. But, gradually, they collected in lodging houses that developed into the colleges that still serve as students' living quarters and study centres.

The six earliest colleges founded at Oxford were University (founded 1249), Balliol (1263), Merton (1264), Exeter (1314), Oriel (1326), and Queen's (1340). For centuries, Oxford accepted only male students. However, after 1878 five women's societies were founded; most of them attained the status of colleges in 1926. Now colleges are generally *coeducational,* with both men and women students.

The evolution of colleges at Cambridge was similar to the Oxford pattern. The six earliest Cambridge colleges were Peterhouse (1284), Clare (1326), Pembroke (1347), Gonville and Caius (1348), Trinity (1350), and Corpus Christi (1352).

Throughout the following decades, a variety of Europe's most distinguished universities were established, including Vienna (1365) in Austria; Heidelberg (1386), Cologne (1388), and Leipzig (1409) in Germany; St. Andrews (1410) in Scotland; and Copenhagen (1479) in Denmark.

When the United States was still a British colony, institutions of higher learning were founded, each modelled on Oxford and Cambridge. The first was Harvard, which was founded in 1636 in the Massachusetts colony, where more than 100 graduates of Oxford and Cambridge had already settled. The second was William and Mary. It was founded in 1693 in the Virginia colony by authority of a charter from Britain's King William III and Queen Mary II. The third was Yale. Inaugurated as a collegiate school in 1701 in the Connecticut colony, Yale was then reorganized as a university a century later when schools of medicine, divinity, law, and fine arts were added.

Other colonial universities patterned after their European predecessors include McGill (1821), Toronto (1827), and Ottawa (1848) in Canada; Sydney (1850) in Australia; Calcutta, Bombay, and Madras (all 1857) in India; Otago (1869) in New Zealand; and Cape of Good Hope (1873) in South Africa. In the Philippines, two universities have a long history: Santo Tomás (1611) and San Carlos (founded 1595, university status 1948). The Technological University of Malaysia was founded in 1925 (university status 1972). The National University of Singapore, established in 1980, has its origins in the King Edward VII College of Medicine (1905).

Today, there are hundreds of universities throughout the world. Most have been created by expanding existing academies and colleges to serve the rapidly growing numbers of students seeking higher education. In formerly colonized areas of Asia and Africa, nations that attained independence after World War II ended in 1945 have established many universities to serve populations that previously lacked opportunities for advanced education.

Related articles in ***World Book*** include:

Al-Azhar University
Bologna, University of
Cambridge University
Dublin, University of
Edinburgh, University of
Education
Glasgow, University of
Harvard University
London, University of
Open University
Oxford University
Paris, University of
Sorbonne
Yale University

Outline

I. Universities and other education institutions

II. Organization and responsibilities
  A. Responsibilities
  B. Organization
  C. Finance

III. Selecting students

IV. Teaching methods

V. Open universities

VI. Degrees

VII. History

Unknown soldier. After World War I (1914-1918), officials of the Allied countries found that the bodies of many soldiers killed in battle could not be identified. The governments of Belgium, France, Great Britain, Italy, and the United States decided to honour in some special way the memory of these soldiers. Each government chose a symbolic unknown soldier, buried the remains in or near the national capital, and built a monument in honour of the soldier. Belgium placed its unknown soldier in a tomb at the base of the Colonnade of the Congress in Brussels. France buried its unknown soldier beneath the Arc de Triomphe in Paris, and keeps a flame always burning over the grave. Great Britain buried its unknown soldier in Westminster Abbey, London. Italy's unknown soldier lies in front of the monument to Victor Emmanuel in Rome. The United States buried its unknown soldier in Arlington National Cemetery in Virginia, across the Potomac River from Washington, D.C.

See also **Arc de Triomphe.**

Untouchable. See **Caste; India** (Religion).

Unwin, Sir Raymond (1863-1940), was a pioneer in British town planning. In 1903, with his partner Barry Parker, he won the competition for Letchworth Garden City, Hertfordshire. Unwin's layout kept 1,200 hectares as a green belt and used the remaining 1,200 hectares for the town, with a factory area separate but accessible. Unwin and Parker later laid out Earswick model village, near York. In 1906, Unwin produced a plan for Hampstead Garden Suburb. Unwin was born at Rotherham, in South Yorkshire. He wrote *Town-planning in Practice* (1909).

Upanishads are a group of writings that make up the last section of a collection of Hindu scriptures called the Vedas. The Upanishads form a basic part of Hinduism and have influenced most Indian philosophy.

The Upanishads are sometimes called the *Vedanta,* which means *the summing up of the Veda.* The word *Upanishads* means *to sit close to.* It suggests that this sacred material was originally secret. Most of the Upanishads were composed as dialogues between a teacher and a student. The most important ones appeared between 800 and 600 B.C.

Several important Hindu schools of thought, including the sankhya and yoga schools, were founded on the teachings of the Upanishads. These teachings follow two basic philosophies. One states that there is a single fundamental reality, called *Brahman,* or God, which corresponds to *Atman,* the soul. Thus, there is no real distinction between the soul and God. The other Upanishadic philosophy states that each soul is individually eternal.

See also **Hinduism; Vedas.**

Upas is the name of a large forest tree that grows in southeastern Asia and Indonesia. Supposedly, the local people mixed its poisonous milky sap with other plant poisons to poison arrows and darts. Tales about the deadliness of this poison terrified early explorers and travellers in the East Indies. Fabulous but false stories started regarding the poison and the plant producing it. People said that nothing could grow in the shade of the tree. They said the tree brought death to birds that perched on it or flew above it. Some people believed that only persons completely covered with clothes could approach the tree without danger.

Scientific classification. The upas belongs to the mulberry family, Moraceae. It is *Antiaris toxicaria.*

Updike, John (1932-), is an American author of novels, short stories, essays, and poetry. Updike became noted for his elaborate, lyrical prose style. He served as a staff writer for *The New Yorker* magazine from 1955 to 1957 and built his literary reputation as a frequent contributor to *The New Yorker.*

Much of Updike's fiction explores the superficial but attractive materialism he sees in middle-class American life. Typical Updike characters are self-absorbed, guilt-ridden, and obsessed with their own unimportance and the prospect of their death. They relieve their anxieties through marital unfaithfulness, but this fails to help them in their search for spiritual salvation. These characters appear in such novels as *A Month of Sundays* (1975) and *Marry Me* (1976).

In the novel *Couples* (1968) and the stories collected in *Museums and Women* (1972), Updike dramatized the disintegrating morals and marriages in several suburban families. The autobiographical stories in *Too Far to Go* (1979) narrate the course of the Maple family from newlywed happiness to divorce.

John Updike

Updike's first popular work, *Rabbit Run* (1960), is a novel about Rabbit Angstrom, a former school basketball star bewildered by family responsibilities. In *Rabbit Redux* (1971), Rabbit confronts such issues of the late 1960's as drug use, racial violence, and the Vietnam War. *Rabbit Is Rich* (1981) portrays Rabbit in middle age, wealthy but spiritually unfulfilled. *Rabbit Is Rich* won the 1982 Pulitzer Prize for fiction. *Rabbit at Rest* (1990) is the last of the four Rabbit books.

Updike was born in Shillington, Pennsylvania. Many of the early stories collected in *Pigeon Feathers* (1962) deal with the experiences of young people in a town based on Shillington. Updike's other novels include *The Centaur* (1963), *The Coup* (1978), *The Witches of Eastwick* (1984), *Roger's Version* (1986), and *S.* (1988). Updike's poems have been collected in *Midpoint* (1969) and *Tossing and Turning* (1977).

Upper Volta. See **Burkina Faso.**

Upsilon particle is the heaviest known subatomic particle. It has a mass about 10 times as large as that of a proton. The upsilon particle is unstable and quickly breaks down into lighter particles. It has no electric charge.

Upsilon particles are a type of *meson,* a particle made up of units called *quarks.* Upsilon particles consist of a quark and its antimatter counterpart, an *antiquark.* When such a particle breaks down, the quark and antiquark destroy each other. This destruction results in the release of energy and the creation of lighter particles.

A group of American physicists, led by Leon M. Lederman, discovered the upsilon particle in 1977. They produced the particle by causing high-energy protons to collide with light atomic nuclei. The upsilon particle decays too rapidly to be observed directly. It was detected by observing the lighter particles that resulted from its breakdown. The large mass of the upsilon indicated that its quark was heavier than other quarks. This new quark was named *b-quark.*

See also **Antimatter; Quark.**

Ur, a city in the ancient region of Sumer (now southeastern Iraq), was one of the world's first cities. It stood on the Euphrates River near the Persian Gulf and thrived from about 3500 to at least 1850 B.C. Nearby communities came under Ur's control during this period, and Ur became a strong city-state. A shift in the course of the Euphrates later isolated Ur from river traffic.

Between about 3000 and 2000 B.C., Ur served as the capital of three major ruling families. The third of these families, founded by King Ur-Nammu about 2100 B.C., controlled a large empire that extended from Assyria in the northwest to Elam in the southeast. This family's reign ended about 2000 B.C., when Elam conquered Ur. The Bible states that Abraham came from Ur.

See also **Babylonia; City** (pictures); **Sculpture** (The beginnings [picture]); **Sumer.**

Uraemia is a condition that occurs when excessive quantities of nitrogen-rich wastes, mainly urea, build up in the blood. Such wastes normally pass out of the body in the urine, which is produced by the kidneys. Uraemia results if the kidneys do not rid the body of these wastes. The word *uraemia* means *urine in the blood.*

Uraemia occurs mostly in adults who have a kidney disease. Uraemia develops gradually as poisons accumulate because of the damaged kidneys. Doctors can treat a few of the diseases that cause uraemia. But in most cases, the diseased kidneys cannot recover, and advanced uraemia occurs. The symptoms of advanced uraemia include nausea, vomiting, hiccups, loss of appetite, breath that smells of urine, drowsiness, and itchy, yellowish discoloration of the skin. Patients may also have muscular twitching, mental disturbances, and convulsions. Untreated patients lapse into a coma and die.

Doctors use two methods to keep uraemia victims alive. A *dialysis machine* cleanses the blood in much the same way as the kidneys do. Kidney transplants replace diseased kidneys with healthy ones.

See also **Kidney; Nephritis; Tissue transplant.**

Ural Mountains extend for about 2,400 kilometres through the western part of Russia. The mountains run south from the Arctic Circle to near the Kazakhstan border. Many geographers consider them to be one of the boundaries between Europe and Asia. See **Russia** (terrain map).

The Ural Mountains contain a remarkable amount of mineral wealth. Salt mining in the mountains has been important since the 1500's. Iron and copper mining and production became important in the 1700's. The Ural region is famous for its gems and semiprecious stones, which include amethyst, beryl, emeralds, malachite, and topaz. Other mining products include bauxite, chromium, coal, copper, gold, iron, lead, nickel, platinum, potash, silver, and zinc. The Urals also have one of the world's largest asbestos reserves. Oil and natural gas are found east and west of the mountains.

The development of the Ural Mountains played an important part in supplying metals, fuels, and other materials to the Soviet Union during the mid-1900's. Until 1991, Russia was one of the republics that made up the Soviet Union. The industrialization of the region severely polluted the air and water in the Urals.

The mountains were formed about 300 million years ago. They were worn down to nearly a plain, and then formed again about 200 million years ago. Since then, they have been worn down to rounded hills, most of which rise only from 300 to 1,800 metres. The southern range spreads as wide as about 160 kilometres from east to west in some places. In the north, the mountain range is narrower and less rounded. The highest peak of the Ural Mountains is Mount Narodnaya (1,895 metres).

Ural River is a river that rises in the southern Ural Mountains in Russia. For location, see **Russia** (terrain map). The Ural flows south from Russia through Kazakhstan for about 2,527 kilometres and enters the Caspian Sea. Salmon and sturgeon fisheries are along the Ural. Railways cross it at Orenburg and Uralsk. A steel centre, Magnitogorsk, lies on the upper Ural.

Urania. See **Muses.**

Uranium is a chemical element with symbol U. It is a silvery-white, radioactive metal, and the main source of nuclear energy. It is more plentiful than such "common" elements as iodine, mercury, and silver. But only tiny amounts of uranium are present in most of the rocks in which it is found. Uranium is highly reactive, and it combines with most other elements to form chemical compounds, all of which are extremely poisonous.

Uranium is used chiefly as a fuel for nuclear reactors. The reactors produce nuclear energy with which nuclear power plants generate electricity. About 0.45 kilogram of uranium produces as much energy as 1,000 metric tons of coal. Uranium is also used in making atomic bombs and some other nuclear weapons. Medical researchers use it to produce radiation for certain experiments. Also, uranium is used in research to produce radioactive isotopes and such artificial elements as neptunium and plutonium.

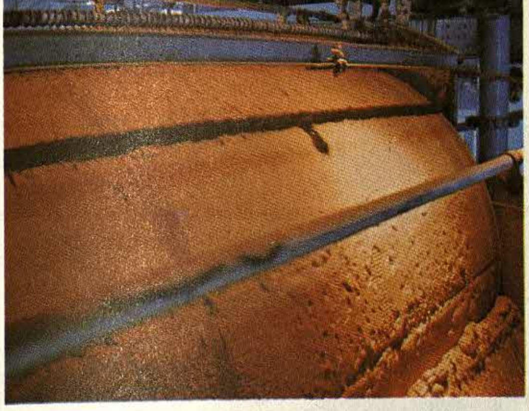
Uranium was discovered in 1789 by the German chemist Martin Klaproth. He found it in pitchblende, a dark bluish-black mineral. Klaproth named uranium in honour of the planet Uranus, which had been discovered eight years earlier. In 1841, pure uranium was isolated from the other elements in pitchblende by the French chemist Eugène Péligot.

Sources of uranium

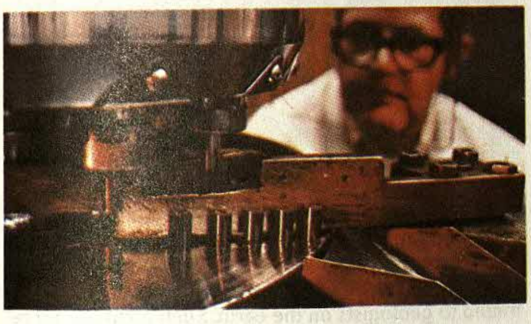
Many rocks contain uranium. Large amounts of uranium occur only in such minerals as pitchblende and carnotite. Pitchblende, which contains various uranium oxides, is the richest uranium ore. Carnotite consists of uranium, oxygen, potassium, and vanadium.

In the early 1990's, the world had a total of about 1,600,000 metric tons of uranium ore that could be mined. There are also large amounts of uranium in deposits of shale and phosphate, in granite, and in the oceans. However, such deposits cannot yet be mined at a reasonable cost to make them profitable. World production of uranium is about 41,600 metric tons a year. Canada leads all countries in the production of uranium.

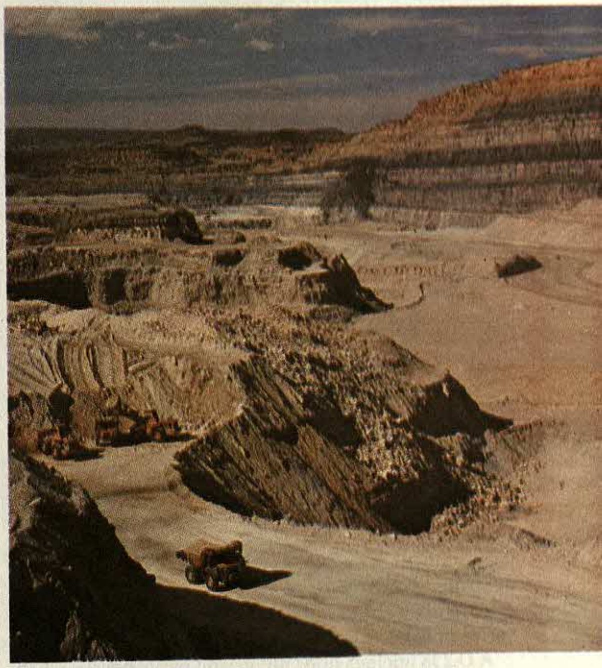
Other important uranium producers include Australia, Namibia, and the United States. Much of the



Yellowcake, a form of processed uranium



Pellets of uranium fuel



A uranium mine

Production of uranium as nuclear fuel involves several steps. Trucks carry uranium ore from the mine to processing plants. There, a uranium concentrate called *yellowcake* is produced. After much further processing, the uranium is compressed into fuel pellets.

uranium that is produced in South Africa is a by-product of gold mining. The gold mines in the Witwatersrand area, near the city of Johannesburg, South Africa, provide large amounts of uranium.

Uranium isotopes

In nature, uranium consists of a mixture of three isotopes—U-238, U-235, and U-234. These isotopes of uranium have different weights, but each has 92 protons in its nucleus. The uranium isotopes differ in weight because they have different numbers of neutrons in their nuclei.

Each isotope has its own *mass number,* which is the total number of protons and neutrons in the nucleus. U-235, the most important isotope of uranium, has a mass number of 235. U-235 is used in nuclear reactors and some nuclear weapons. It can be used for such purposes because it is the only natural isotope of uranium that can easily be made to *fission*—that is, split into two nearly equal parts. U-235 makes up only about 0.71 per cent of all natural uranium. U-238, which is the heaviest natural uranium isotope, accounts for approximately 99.28 per cent of the natural uranium. U-234 makes up only about 0.006 per cent of the world's supply.

Scientists have produced 11 artificial isotopes of uranium. U-233, made from thorium, is the most important because it is used in nuclear reactors (see **Thorium**).

Properties of uranium

Uranium has an atomic weight of 238.029 and is the heaviest natural element. It has the atomic number 92. It melts at 1132° C and boils at 3818° C. At 20° C, uranium has a density of 19.07 grams per cubic centimetre (see **Density**). Uranium belongs to the group of elements that is called the *actinide series* (see **Element, Chemical** [Periodic table]).

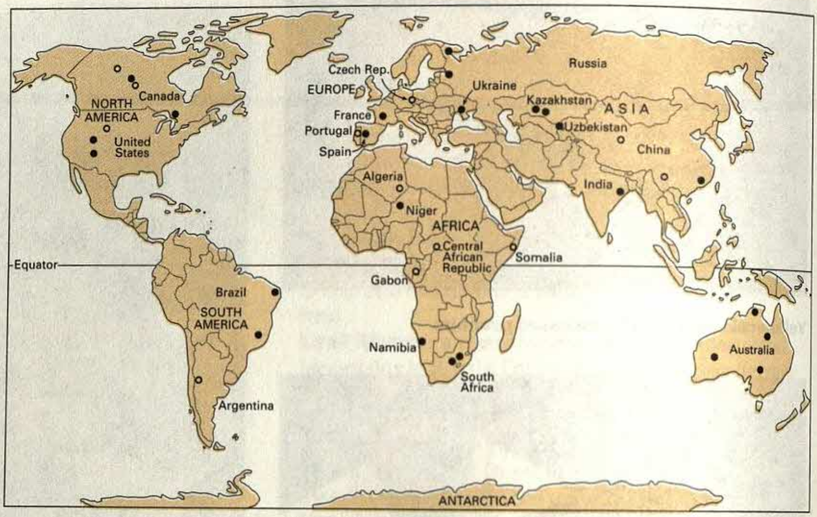
Ability to form compounds. Uranium combines directly with most substances to form chemical compounds. For example, it combines with oxygen to produce several oxides, including uranium oxide (UO_2) and uranium trioxide (UO_3). Uranium also reacts with acids in air, forming certain types of salts, called *uranyl salts.*

Uranium reacts with fluorine to create such fluorides as uranium tetrafluoride (UF_4) and uranium hexafluoride (UF_6). It can also combine with carbon, chlorine, hydrogen, nitrogen, and many other elements.

Radioactivity and fissionability. All isotopes of uranium are radioactive. Their nuclei *decay* (break apart), releasing energy and particles, chiefly in the form of *alpha rays, beta rays,* and *gamma rays* (see **Alpha particle; Beta particle; Gamma rays**). In nature, the loss of such radiation and particles from the uranium nuclei eventually changes uranium into a lead isotope that is not radioactive (see **Transmutation of elements**).

Uranium isotopes give off radiation for long periods of time. For example, U-238 loses half its radioactivity every $4\frac{1}{2}$ billion years. This length of time is called a *half-life.* U-235 has a half-life of 700 million years, and U-234 has a half-life of only 250,000 years.

A uranium nucleus fissions into two fragments when a neutron strikes it. U-235 fissions much more readily than U-238. When a U-235 nucleus fissions, it releases a



Uranium is found on most of the continents. This map shows the location of major known uranium deposits. The United States has the largest known deposits, followed by Canada and Australia. Information on uranium deposits in some countries is not available.

large amount of energy. It also releases two or more neutrons. These neutrons split other nuclei, which then release neutrons that split still more U-235 nuclei. This series of fissions is called a *chain reaction.*

A U-238 nucleus does not fission easily because it absorbs most of the neutrons that strike it. But a U-238 nucleus that continues to be struck by neutrons of extremely high energy may change into U-239, an artificial isotope of uranium. U-239 decays into neptunium by giving off beta particles. The neptunium then decays by beta radiation into an isotope of plutonium, Pu-239 (see **Neptunium; Plutonium**). Pu-239 fissions easily and can be used in nuclear reactors and weapons. It can be produced from U-238 in a special type of nuclear reactor, called a *breeder reactor.*

How uranium is mined and processed

Locating and mining uranium. Since the end of World War II in 1945, geologists have made extensive efforts to locate deposits of uranium ore. Traditionally, uranium prospectors have used Geiger counters or scintillation counters to locate uranium deposits. These instruments detect the radiation given off by uranium. See **Geiger counter.**

Today, scientists also use other instruments to locate uranium. One device is a camera carried in a space satellite. The camera is equipped with colour film or film that is sensitive to infrared rays. The camera takes photographs of an area of land, and the pictures are transmitted to geologists on the earth. Such pictures may reveal certain land formations that contain uranium ore.

Another device for locating uranium is an instrument called a *gamma ray recorder.* It detects radiation and indicates how far uranium lies below the surface of the earth. The recorder is lowered into a hole drilled into the ground. An electric cable connects the device to instruments in a truck. The recorder sends data via the cable to these instruments, which enable uranium prospectors to compute and record the information.

Uranium near the earth's surface is mined by a process called *strip mining.* Huge power shovels remove the rocks and soil that cover the deposits, and smaller shovels then dig out the uranium ore.

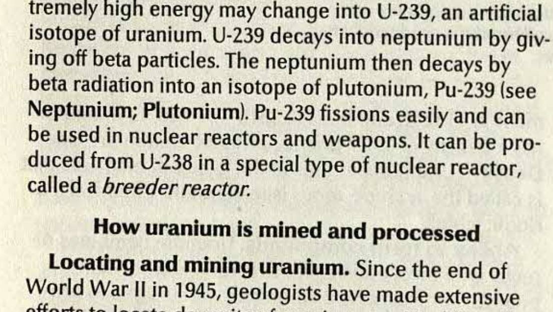
Miners use explosives and drills to excavate uranium ore that lies deep below the ground. The explosives loosen the ore, and the miners drill into the walls of the mine to remove it. They load the ore into buckets that are hoisted by cables to the surface. The ore is then loaded into trucks.

Refining and processing uranium ore. The uranium ore is taken from the mine to a *uranium-concentrating plant.* There, workers use sulphuric acid to extract an oxide of uranium, U_3O_8. This oxide forms a uranium concentrate called *yellowcake.* The yellowcake is shipped to another plant, where it is combined with fluorine to produce uranium hexafluoride (UF_6).

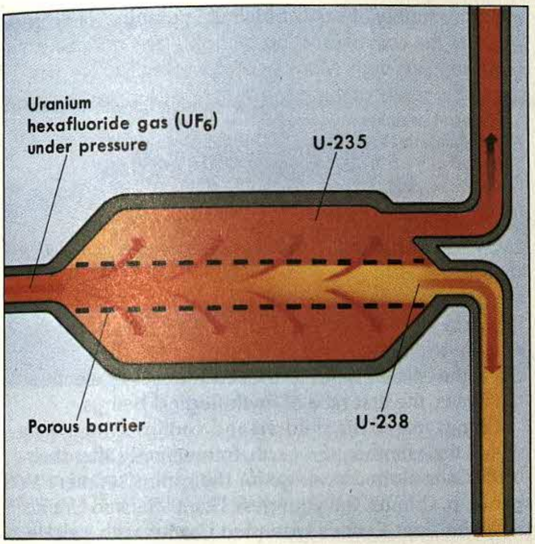
The uranium hexafluoride then goes to an *enrichment plant,* where the isotopes U-235 and U-238 are separated from each other. The separation of these isotopes produces *enriched uranium,* which contains a higher percentage of U-235 than does natural uranium. The enriched uranium used in nuclear reactors contains about a 3 per cent concentration of this isotope. Nuclear weapons use uranium that has about a 90 per cent concentration of U-235. U-235 is the only natural isotope of uranium that fissions easily and can sustain a chain reaction.

The enriched uranium goes to a *fuel fabrication plant,*

Leading uranium-producing countries



Figures are for 1990, prior to the breakup of the Soviet Union. Soviet Union figure is an estimate.
Source: Uranium Institute, London.



The gaseous diffusion method of isotope separation, shown in the diagram above, uses porous barriers to separate uranium isotopes. Separation occurs because the molecules of uranium hexafluoride gas containing the isotope U-235 pass through the barriers faster than those containing U-238.

where the uranium hexafluoride is converted to uranium dioxide (UO_2). The uranium dioxide is compressed into solid, cylinder-shaped pellets. The pellets are placed in hollow rods made of zirconium or stainless steel. These rods are shipped to nuclear power plants, where they are used as nuclear reactor fuel.

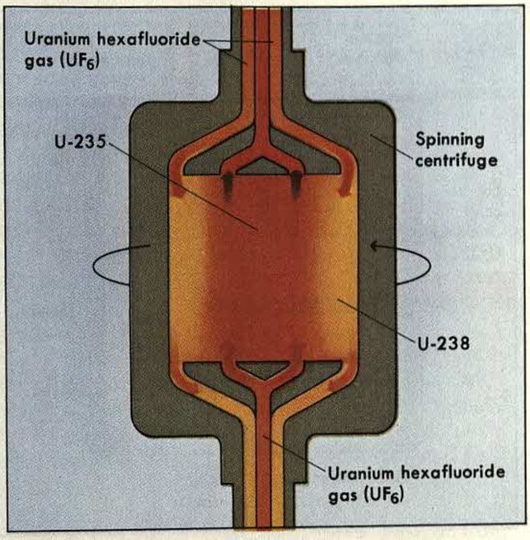
Separating uranium isotopes. Scientists have developed several methods of separating uranium isotopes. Industry uses only the *gaseous diffusion method* and the *centrifugal method.* Researchers are experimenting with two *spectroscopic methods,* which seem to be more efficient and economical than the gaseous diffusion and centrifugal processes. The spectroscopic techniques may eventually replace the other methods.

The gaseous diffusion method of isotope separation is used by the uranium enrichment plants in the United States. In this process, molecules of uranium hexafluoride gas are pumped through barrierlike structures that have millions of tiny holes in them. The composition of these barriers is classified as secret by the United States government.

The weight of the gas molecules determines the rate at which they pass through the holes in the barriers. Molecules that contain U-235 atoms pass through the barriers faster than the heavier molecules, which contain U-238. The different weights of the uranium isotopes produce the difference in the weights of the uranium hexafluoride molecules.

The percentage of molecules containing U-235 increases only slightly in the gas that has passed through a barrier. Highly enriched uranium is obtained by passing the gas through the barrier about 2 million times.

The centrifugal method is used in several enrichment plants in Europe. The centrifuge in this process consists of vertical cylinders that spin rapidly. Uranium hexafluoride gas enters each rotating cylinder through openings in the top and bottom.


Uranium hexafluoride gas (UF₆)
U-235
Spinning centrifuge
U-238
Uranium hexafluoride gas (UF₆)

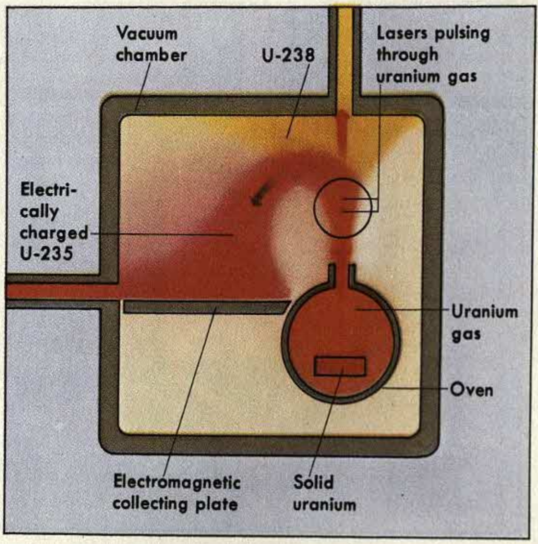
The centrifugal method of separating isotopes uses an artificial gravitational field, produced in a spinning cylinder, to separate uranium isotopes. The field forces uranium hexafluoride molecules containing U-235 and those containing U-238 to travel in different directions.

The spinning motion of the cylinders produces an artificial gravitational field inside them. The weight of the uranium hexafluoride molecules determines how they are affected by this gravitational field. The field forces the heavier molecules, which contain U-238 atoms, out of openings at the bottom of the cylinder near its walls. Molecules that contain U-235 are forced out through openings near the middle of the top of the cylinder. The molecules containing U-235 are then pumped to another cylinder. This process is repeated until the desired concentration of U-235 is obtained.

The spectroscopic methods separate uranium isotopes by means of lasers. A laser is a device that produces a thin beam of light having only one frequency (see **Laser**). The light absorbed by an atom depends on the mass of the atom and the frequency of the light. Light of some frequencies is absorbed by U-235, but not by U-238.

In one spectroscopic technique, two lasers are used to separate isotopes in uranium gas. The lasers produce light of different frequencies, but only the U-235 atoms absorb it. One electron in each U-235 atom goes into an *excited* (high-energy) state when it absorbs light from the first laser. The light from the second laser strikes the excited electron and knocks it out of its orbit around the nucleus of the atom. Each of the atoms that loses an electron acquires a positive electric charge. An electric field sweeps the positively charged U-235 atoms onto smooth, negatively charged pieces of metal called *collecting plates.* The electric field does not affect the U-238 atoms because they have no electric charge.

The other spectroscopic method separates uranium isotopes by using molecules of such chemical compounds as uranium hexafluoride and uranium borohydride ($U[BH_4]_4$). Light from a laser excites only the molecules that contain U-235. Continued radiation of light from a second laser changes the chemical properties of


Vacuum chamber
U-238
Lasers pulsing through uranium gas
Electrically charged U-235
Uranium gas
Oven
Electromagnetic collecting plate
Solid uranium

The spectroscopic method separates uranium isotopes by the use of two lasers. The lasers cause only the U-235 atoms to acquire an electric charge. A charged collecting plate produces an electric field, which sweeps the U-235 atoms onto the plate. The electric field does not affect the uncharged U-238 atoms.

the excited molecules. The change in the molecules that contain U-235 causes them to have chemical properties different from those of the molecules containing U-238. Chemical reactions that affect only the molecules containing U-235 are used to separate them from the molecules with U-238.

History of the uses of uranium

Uranium and its compounds have been used for various purposes for more than 2,000 years. Coloured glass produced about A.D. 79 contains uranium oxide, and this substance has been used through the centuries to colour glass. For nearly 100 years after the discovery of uranium in 1789, it continued to be used chiefly as a pigment in glass manufacturing. Uranium was also used as a pigment in painting china and as a chemical for processing photographs.

In 1896, the French physicist Antoine Henri Becquerel discovered that uranium is radioactive. His achievement marked the first time that any element had been found to be radioactive. Becquerel's discovery led to a surge of scientific interest in uranium.

In 1938, the German chemists Otto Hahn and Fritz Strassman used uranium to produce the first artificial nuclear fission. In 1942, Italian-born physicist Enrico Fermi and his co-workers at the University of Chicago produced the first artificial nuclear chain reaction. They used uranium as the fissionable material. Fermi's work led to the development of the atomic bomb.

Scientific research also led to peacetime uses of uranium. In 1954, the U.S. Navy launched the *Nautilus,* the first submarine powered by nuclear fuel. In 1957, the first nuclear power plant in the United States began to operate in Shippingport, Pennsylvania, near Pittsburgh.

Since the early 1970's, nuclear energy has become an important source of energy. Many scientists predict that it will continue to play a major role in the future. However, the supply of easily obtainable uranium is decreasing, and the cost of locating, refining, and enriching uranium remains high. Many people are also concerned about the safety of nuclear energy production.

Related articles in *World Book* include:

Atom (diagram: How atoms compare)
Isotope
Nuclear energy
Nuclear reactor
Nuclear weapon
Radioactivity
U-235

Uranium dioxide. See **Nuclear energy** (Fuel preparation).

Uranium-235. See **U-235.**

Uranus was the earliest god of the sky in Greek and Roman mythology. He was the son and husband of Gaea, the earth. Uranus and Gaea were the parents of the Titans, the first race of mythological beings.

Uranus feared his children and confined them deep within their mother, the earth, immediately after their birth. Gaea plotted revenge for their imprisonment. With her help, Cronus, the youngest Titan, attacked Uranus while he slept. Cronus wounded Uranus with a sickle and made him unable to father any more children. Because of his wound, Uranus became separated forever from Gaea. The Greeks and Romans used this myth to explain the separation of the earth from the sky.

After being separated from Gaea, Uranus played little part in mythology. His functions as god of the sky were taken over by his grandson, called Zeus by the Greeks and Jupiter by the Romans.

See also **Mythology** (Greek mythology); **Titans.**

Uranus is the seventh planet from the sun. Only Neptune and Pluto are farther away. Uranus has a diameter of about 51,118 kilometres, which is more than four times the diameter of the earth.

Uranus travels around the sun in an oval-shaped orbit. Its mean distance from the sun is about 2,875,000,000 kilometres. The planet takes 30,685 earth-days to go around the sun. At its closest approach to the earth, the planet is about 2,587,000,000 kilometres away.

While orbiting the sun, Uranus rotates on its *axis,* an imaginary line through its centre. The axes of most planets are almost *perpendicular* (at an angle of 90°) to the planets' paths around the sun. But the axis of Uranus is tilted 98° from the perpendicular position, so that it is almost level with the planet's path around the sun. Uranus takes about 17 hours to spin on its axis. The large angle

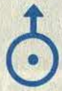
Satellites of Uranus

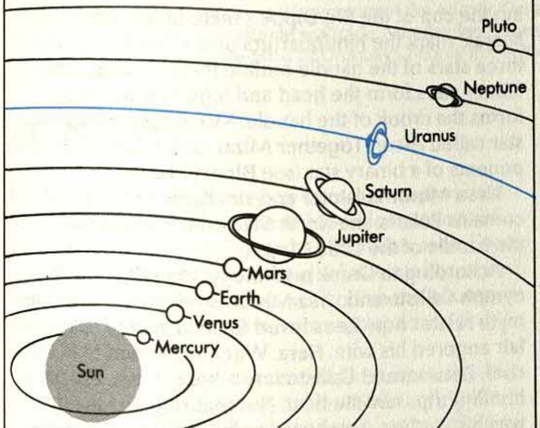
Name or designation	Mean distance from Uranus in kilometres	Diameter of satellite in kilometres	Year of discovery
Oberon	583,400	1,525	1787
Titania	436,300	1,580	1787
Umbriel	266,000	1,170	1851
Ariel	190,900	1,160	1851
Miranda	129,900	570	1948
Puck	86,000	170	1985
Portia	66,100	80	1986
Juliet	64,400	80	1986
Cressida	61,800	60	1986
Rosalind	69,900	60	1986
Belinda	75,300	60	1986
Desdemona	62,700	60	1986
Cordelia	49,800	40	1986
Ophelia	53,800	50	1986
Bianca	59,200	50	1986

Uranus and its moon Miranda, *right foreground,* appear in this composite picture made from photographs taken by the U.S. *Voyager 2* spacecraft in 1986. This probe also discovered that Uranus has 15 moons and at least 11 rings around it.

Uranus at a glance

Uranus, shown in blue in the diagram, is the seventh closest planet to the sun. Astronomers still use the ancient symbol for Uranus, *right.*





Distance from the sun: *Shortest*–2,739,300,000 km; *Greatest*–3,010,700,000 km; *Mean*–2,875,000,000 km.

Distance from the earth: *Shortest*–2,587,000,000 km; *Greatest*–3,156,000,000 km.

Diameter: 51,118 km.

Length of year: 30,685 earth-days.

Rotation period: 17 hours 8 minutes.

Temperature: −216° C.

Atmosphere: Hydrogen, helium, methane.

Number of satellites: 15.

of tilt and the rapid spin make it appear to roll along in its orbit. See **Planet** (illustration: The axes of the planets).

Uranus consists largely of dense, cold gas. At its centre is a small core of rock. Astronomers estimate the temperature of Uranus to be −216° C. Uranus has 15 known satellites. The planet also has at least 11 thin rings around it. The rings are much fainter than those of Saturn. They appear to consist of countless chunks of an unknown black material. Most of these chunks are about 90 centimetres in diameter. The rings always remain parallel to Uranus' equator.

The British astronomer Sir William Herschel discovered Uranus in 1781. From 1787 to 1948, astronomers detected five small moons orbiting the planet. Ten other moons, smaller than the first five, were discovered by the United States spacecraft *Voyager II,* which flew by the planet in 1986.

See also **Planet; Solar system; Herschel** (Sir William).

Urban II (1042?-1099) was elected pope in 1088. Like the popes he followed, Urban was a vigorous reformer. He held a series of councils to promote the moral and institutional reform of the church. In 1095, Urban held a great council at Clermont, France. Although this council issued important reform decrees, it is best known for launching the call for what became the First Crusade. See **Crusades** (How the Crusades began).

Urban faced continuous and stormy opposition from the German emperor, Henry IV. Throughout the pope's reign, he had to contend with antipopes who denied him full control of Rome. However, Urban was a brilliant diplomat. His manipulation of northern Italian politics prevented the emperor or the pope's other enemies from concentrating their attention on him.

Urban increased the papacy's prestige by his elegant personal bearing, by his diplomatic skill, by launching the First Crusade, and by expanding papal authority into Spain. He was born in Châtillon-sur-Marne, near Épernay, France. His given name was Odo.

Urban VI (1318-1389) was elected pope in 1378. Events during his reign led to a controversy called the *Great Schism* that divided the papacy until 1417.

Urban succeeded Pope Gregory XI, who had returned the papacy to Rome after almost 70 years in Avignon, France. Romans feared the election of another Frenchman and rioted, demanding a Roman or Italian pope. In this atmosphere, the cardinals elected Urban, an Italian. Urban soon demonstrated an unstable character. He abused the cardinals so badly that a majority concluded that Urban was mentally unbalanced. Five months after his election, 13 cardinals declared he had been elected through intimidation. They elected Clement VII to replace Urban. England, Germany, and most of Italy gave their allegiance to Urban. Burgundy, France, Naples, Savoy, and Scotland followed Clement.

Urban was born in Naples. His given and family name was Bartolomeo Prignano.

See also **Roman Catholic Church** (The Great Schism); **Clement VII** (antipope).

Urea, also called *carbamide,* is a nitrogen-rich organic compound produced by the bodies of human beings and many other animals. It is also made artificially for use in such varied products as cattle feed, fertilizers, pharmaceuticals, and plastics.

Urea is a white crystal or powder that dissolves readily in water. The human body produces urea as a means of ridding itself of excess nitrogen. Urea forms chiefly in the liver, and is eliminated mostly in the urine.

Urea was the first organic compound to be artificially produced from inorganic material. In 1828, the German chemist Friedrich Wöhler made urea by heating a water solution of ammonium cyanate, an inorganic compound. Wöhler's work helped to overthrow the belief that organic compounds could be formed only by natural forces operating within living organisms. Urea's chemical formula is $CO(NH_2)_2$.

Uremia. See **Uraemia.**

Urethra. See **Bladder; Kidney.**

Urey, Harold Clayton (1893-1981), was an American chemist who made important contributions in two main fields. During his early career, he conducted research on *isotopes,* which are atoms of the same element that differ in atomic weight. Urey's later work centred on the history and chemical nature of the solar system. During the late 1960's and early 1970's, he played a prominent role in the interpretation of lunar samples gathered by Apollo astronauts.

Urey won the 1934 Nobel Prize for chemistry for the discovery of deuterium, a rare isotope of hydrogen (see **Deuterium**). During World War II (1939-1945), he directed a laboratory where isotopes of boron, hydrogen, and uranium were produced for use in the development of the atomic bomb. Urey's study of the earth and the solar system began after the war. He calculated the temperature of ancient oceans by determining the amount of certain isotopes in fossil shells. He also studied the chemical makeup of the sun, moon, and planets and formulated theories on the origin of the solar system.

Urey was born in Walkerton, Indiana. He earned a Ph.D. degree in chemistry from the University of California at Berkeley.

Urine is a liquid waste product of the body produced by the kidneys. A healthy person's urine is amber-coloured and slightly acid. Urine is a little heavier than water with an average specific gravity of 1.022. Urine consists mainly of water. It also contains urea, creatinine, uric acid, and such inorganic salts as sodium, potassium, ammonia, calcium, and magnesium.

Blood reaches the kidneys through the *renal* arteries. Waste matter and water removed from this blood passes from the kidneys to the urinary bladder through two small tubes, the *ureters.* Urine is stored in the bladder until *urination* occurs. The urine then is expelled to the outside through another tube, the *urethra.*

Most adults produce about 1.4 litres of urine daily, but the amount may vary. During sleep, the amount is smaller and more concentrated. Less urine is produced when a person is dehydrated, and more when a person drinks large amounts of liquid. The *antidiuretic hormone,* given off by the pituitary gland, controls the amount of water held by the *nephrons* (tiny kidney tubes). Certain diseases may also change the amount and strength of urine.

The condition of urine is often an index to a person's health. Sugar in the urine is a sign of diabetes. The appearance of blood in the urine may mean that the kidneys have been damaged or that an infection exists in the bladder or kidneys.

See also **Bladder; Diuretic; Kidney; Uraemia.**

Uris, Leon (1924-   ), an American author, became known for his best-selling novels based on modern historical events.

During World War II (1939-1945), Uris served in the United States Marine Corps. He drew on his war experiences in his first novel, *Battle Cry* (1953). *Exodus* (1958) is a love story set against the founding of the state of Israel. His other novels include *The Angry Hills* (1955), *Mila 18* (1961), *Armageddon* (1964), *Topaz* (1967), *QB VII* (1970), *Trinity* (1976), *The Haj* (1984), and *Mitla Pass* (1988).

With his third wife, Jill, Uris published two text-and-photo books, *Ireland: A Terrible Beauty* (1975) and *Jerusalem: Song of Songs* (1981). He wrote the screenplay for the film version of *Battle Cry* (1954) and the western *Gunfight at the OK Corral* (1957). Leon Marcus Uris was born in Baltimore, Maryland.

Urology. See **Medicine** (table: Major medical speciality fields).

Ursa Major and Ursa Minor are two *constellations* (star groups) seen in the northern sky but not visible from south of the equator. In English, the names *Ursa Major* and *Ursa Minor* mean *the Great Bear* and *the Little Bear.* Both constellations contain smaller groups of stars that resemble the outlines of two long-handled cups, or *dippers.* These smaller groups are therefore sometimes called the Big Dipper and the Little Dipper. In Britain, the Big Dipper is usually called the Plough, or sometimes Charles's Wain (which means Charles's wagon).

Ursa Major contains two stars, Dubhe and Merak, that mark the front of the Big Dipper and point to Polaris, the North Star (see **North Star**). The four stars forming the cup of the Big Dipper, including Dubhe and Merak, mark the hindquarters of the Great Bear. The three stars of the handle outline the bear's tail. Other fainter stars form the head and legs. The star Mizar forms the crook of the handle. Mizar has a companion star called Alcor. Together Mizar and Alcor are the components of a binary star (see **Binary star**).

Ursa Minor is fainter and smaller than Ursa Major. It contains Polaris, the North Star, which marks the end of the handle of the Little Dipper.

According to Greek mythology, Ursa Major is the nymph Callisto and Ursa Minor is her son Arcas. One myth relates how Zeus loved Callisto, and their love affair angered his wife, Hera. When Hera tried to kill her rival, Zeus turned Callisto into a bear. Arcas, out on a hunting trip, saw the bear. Not realizing that the bear was his mother, Arcas tried to kill it. So Zeus changed Arcas into a bear too and placed both bears in the sky to protect them. Writers of the 1600's said that the bears' tails were stretched because Zeus pulled them up to heaven by their tails.

Ursa Major and Ursa Minor are visible all the year round in the Northern Hemisphere. On winter evenings, Ursa Minor is on the left of Ursa Major. The tail of the Little Bear points upward, while that of the Great Bear points downward. On summer nights, the positions of the constellations are reversed.

Ursulines are members of a Roman Catholic order of women. The order was named after Saint Ursula, its patron saint. The order, also called the *Nuns of Saint Ursula,* was established at Brescia, Italy, in 1535, by Saint Angela Merici. The main work of the Ursulines is the teaching of girls and young women. From the first, the community observed strict discipline. It became a cloistered order through the aid of Saint Charles Borromeo. In 1574, the Ursuline nuns entered France, and a convent was built near Paris in 1611. The order spread rapidly to most countries of Europe and to America.

Peter Menzel

The harbour at Montevideo, at the junction of the Atlantic Ocean and the Río de la Plata, handles most of Uruguay's international sea trade. Montevideo is the country's capital, largest city, and commercial centre. About two-fifths of Uruguay's people live in the Montevideo area.

Uruguay

Uruguay is a small country on the southeastern coast of South America. Among the independent nations of South America, only Suriname has a smaller area. Gently rolling grasslands cover almost all of the interior of Uruguay. Beautiful sandy beaches, which line the country's Atlantic coast, attract tourists from many parts of the world.

Most Uruguayans are descended from Spanish settlers who came to the country in the 1600's and 1700's and Italian immigrants who arrived during the 1800's and early 1900's. Spanish is the nation's official language. More than four-fifths of all Uruguayans live in urban areas, especially along the southern coast. Montevideo, the capital and largest city, has about two-fifths of the nation's total population, and serves as the commercial, political, and cultural hub of the nation.

Service industries, such as government, tourism, and transportation, employ more people than any other part of Uruguay's economy. But a mild climate and abundant natural pasture have made agriculture, particularly livestock raising, the base of the economy. Huge cattle and sheep ranches occupy most of the nation's interior. The leading manufacturing industries of Uruguay process meat, wool, and other livestock products in huge factories called *frigoríficos.*

American Indians were the original inhabitants of what is now Uruguay. However, almost all of them were eventually killed by European settlers or died of diseases brought by the Europeans. Spanish and Portuguese forces fought for control of Uruguay during the 1700's, and Brazil later tried to dominate the country. Uruguay became an independent republic in 1828. During the early 1900's, it developed into one of the most prosperous and democratic nations in South America. But an economic decline during the 1950's and 1960's brought about a period of widespread unrest and military rule. Today, Uruguay is once again ruled by an elected civilian government but remains saddled with substantial external debts.

Government

National government. Democratic governments have ruled Uruguay during most of the 1900's. However, in 1973, during a period of widespread urban violence, military leaders seized control of the government. They

Facts in brief about Uruguay

Capital: Montevideo.
Official language: Spanish.
Official name: *República Oriental del Uruguay* (Eastern Republic of Uruguay).
Area: 177,414 km². *Greatest distances*—north-south, about 530 km; east-west, about 450 km. *Coastline*—about 660 km.
Elevation: *Highest*—Mirador Nacional, 501 m above sea level. *Lowest*—sea level.
Population: *Estimated 1996 population*—3,204,000; density, 18 people per km²; distribution, 86 per cent urban, 14 per cent rural. *1985 census*—3,032,100. *Estimated 2001 population*—3,292,000.
Chief products: *Agriculture*—cattle, sheep, wheat, maize, sugar cane, rice. *Manufacturing*—meat products, leather goods, textiles, beer, cement. *Mining*—gravel, sand, stone.
National anthem: "Himno Nacional del Uruguay" ("National Hymn of Uruguay").
Money: *Currency unit*—Uruguay peso. One peso = 100 centesimos.

suspended the country's Constitution, dissolved the national legislature, and banned all political party activities. The military ruled Uruguay until 1985, when the people demanded a freely elected government, which then assumed office.

Uruguay's Constitution, adopted in 1967 and restored in 1985, provides for a republican form of government. Under the Constitution, voters elect a president, the country's head, to a five-year term. The president may not be reelected until five years after leaving office. The president appoints a Council of Ministers to head various government divisions. Uruguay's legislature, called the General Assembly, consists of a 30-member Senate and a 99-member Chamber of Deputies. Voters elect legislators to five-year terms.

Local government. Uruguay is divided into 19 departments for purposes of local government. Voters in each department elect a governor and a legislature to handle departmental affairs.

Politics. The two largest political parties in Uruguay are the Colorado Party and the National Party, better known as the Blanco Party. The Colorados are traditionally more liberal and tend to be concerned with urban problems. The Blancos generally represent rural interests. Other political parties include the Christian Democratic Party, the Socialist Party, and the Communist Party. Segments of these parties sometimes combine in a larger group called the Broad Front Coalition. All citizens 18 years of age and older may vote.

Courts. A five-member Supreme Court of Justice serves as Uruguay's highest court. The court's justices are elected by the General Assembly to ten-year terms. The nation's judicial system also includes appeals courts, various lower courts, and justices of the peace.

Armed forces. Uruguay's army, navy, and air force have 31,900 members. Military service is voluntary.

People

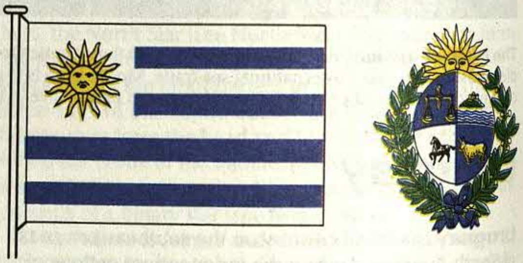
Population and ancestry. Uruguay has over 3 million people. Most Uruguayans live along or near the southern coast. The interior is thinly populated.

Various groups of Indians lived in what is now Uruguay long before the first Spanish settlers arrived in the 1500's. However, by the late 1700's, the country's Indian population had almost completely disappeared. During the 1800's and early 1900's, large numbers of Spanish and Italian migrant workers moved to Uruguay. Today, most Uruguayans are descended from these immigrants. Other groups with European ancestry include people of English, French, German, and Eastern European descent. Between 5 and 10 per cent of Uruguay's people are *mestizos* (people of mixed European and Indian ancestry). Less than 3 per cent are blacks whose ancestors were brought to Uruguay as slaves during the 1700's and early 1800's.

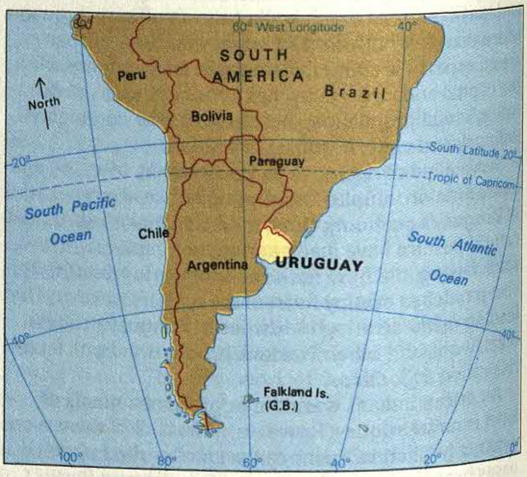
Languages. Nearly all Uruguayans speak Spanish, the country's official language. It is generally spoken with an Italian accent. Many Uruguayans also speak a second language, usually English, French, or Italian. Portuguese is widely spoken in the areas near the country's border with Brazil.

Way of life. Since the mid-1900's, inflation and other economic problems have created some hardships among Uruguay's people. But most Uruguayans still

Uruguayan cowboys, called *gauchos,* herd cattle at a stockyard near Montevideo. Income from Uruguay's thriving livestock industry forms the basis of the country's economy.



Symbols of Uruguay. The flag and the coat of arms were adopted in 1830. The sun on both is a symbol of independence. The flag's stripes represent the nine departments into which the country was originally divided after gaining independence. On the arms, the scales symbolize equality and justice; the horse and ox, liberty and plenty; and the hill of Montevideo, strength.



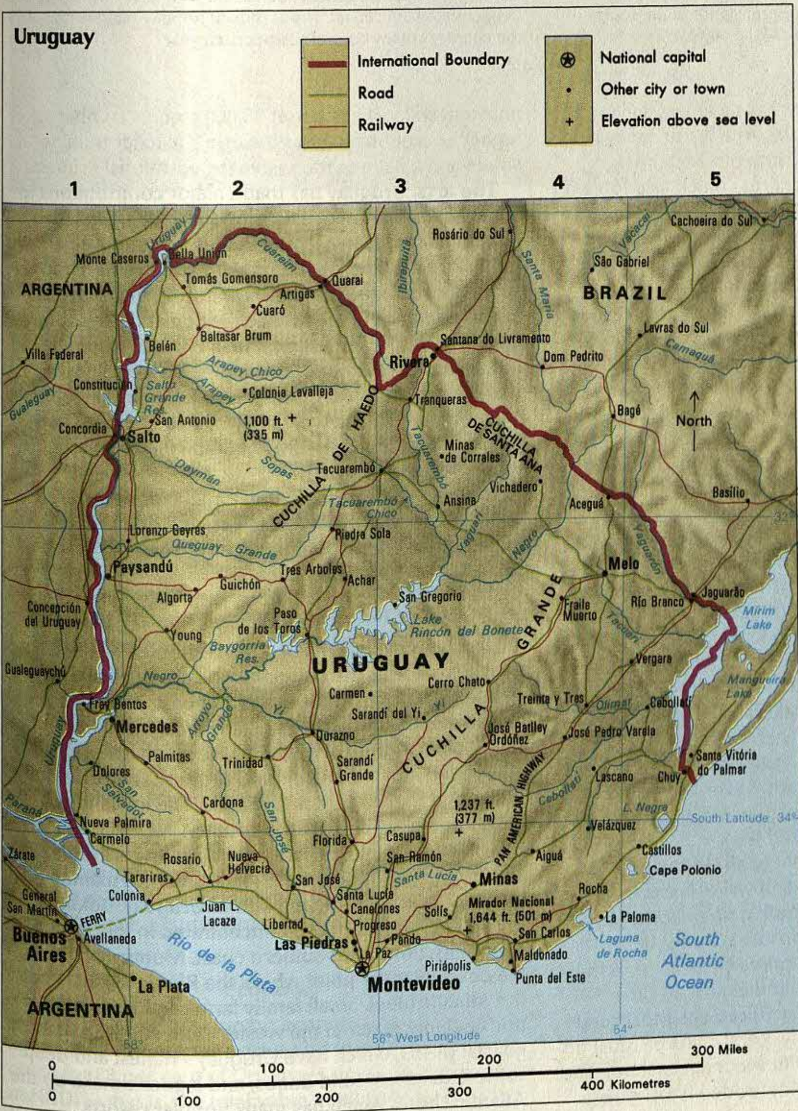
Uruguay is a small country in southeastern South America. It borders Argentina, Brazil, and the South Atlantic Ocean.

enjoy a comfortable standard of living with adequate housing and food and access to good medical care.

About 85 per cent of all Uruguayans live in cities and towns. Montevideo, the capital, is the largest city by far. It has about 1¼ million people, or about two-fifths of the country's total population. No other Uruguayan city has more than 100,000 people. Montevideo serves as a commercial, political, and intellectual centre. It is a bustling city with treelined avenues, beautiful beaches and parks, impressive monuments and buildings, and a variety of cultural and recreational opportunities.

Most of the people in Montevideo and other Uruguayan cities belong to the country's large middle class. Many middle-class city dwellers hold government or professional jobs or work in business and industry. They live in apartments or in comfortable single-family houses. Business executives, government leaders, and other well-to-do city dwellers live in luxurious high-rise apartment buildings or mansions. Uruguay's urban population also includes factory workers, unskilled labourers, household servants, and other people with low-paying jobs. A small number of these working-class people live in tiny shacks on the cities' outskirts. But Uruguay has fewer urban slums than do most other Latin American countries. Electricity, running water, and sewers are available to all but the poorest city dwellers.

About 15 per cent of Uruguay's people live in rural areas. Many of them own or rent small farms, and live in one-storey adobe houses. Others work as wage labourers on large plantations or as *gauchos* (cowboys) on huge ranches called *estancias.* Shacks with thatch roofs and mud floors serve as housing for families of migrant labourers and ranch workers. Many wealthy landowners have homes in the cities, as well as country estates.



Uruguay map index

Cities

Artigas	34,551	A	2
Bella Union	12,254	A	2
Canelones	17,316	E	3
Carmelo	14,127	D	1
Chuy	8,187	D	5
Colonia	19,077	E	1
Dolores	12,914	D	1
Durazno	27,602	D	2
Florida	28,560	D	3
Fray Bentos	20,431	C	1
Juan L. Lacaze	12,454	E	2
La Paz	17,680	E	3
Las Piedras	58,221	E	3
Lascano	7,160	D	4
Libertad	7,018	E	2
Maldonado	33,498	E	4
Melo	42,329	C	4
Mercedes	37,110	D	1
Minas	34,634	E	3
Montevideo	1,247,920	E	3
Nueva Helvecia	8,813	D	2
Nueva Palmira	7,132	D	1
Pando	19,654	E	3
Paso de los Toros	12,826	C	2
Paysandú	75,081	C	1
Progreso	11,224	E	3
Río Branco	9,035	C	5
Rivera	56,335	A	3
Rocha	23,910	E	4
Rosario	8,884	D	2
Salto	80,787	B	1
San Carlos	19,854	E	4
San José	31,732	E	2
Santa Lucia	14,944	E	3
Tacuarembó	40,470	B	3
Treinta y Tres	30,956	C	4
Trinidad	18,271	D	2
Young	11,939	C	2

Physical features

Baygorria Reservoir	C	2
Cape Polonio	E	5
Cuareim River	A	2
Cuchilla de Haedo (mountainous area)	B	3
Cuchilla de Santa Ana (mountainous area)	B	4
Cuchilla Grande (mountainous area)	D	3
Lake Negra	D	5
Lake Rincón del Bonete	C	3
Mirador Nacional (mountain)	E	3
Río de la Plata (estuary)	E	2
Río Negro (river)	C	4
Salto Grande Reservoir	B	2
Santa Lucia River	D	3
South Atlantic Ocean	E	5
Tacuarembó River	B	3
Uruguay River	D	1
Yaguaron River	C	5
Yi River	C	3

Source: 1985 census.

Independence Plaza lies in the heart of Montevideo. A statue of José Artigas, Uruguay's national hero, stands in the centre of the plaza. Salvo Palace, *right,* is one of the city's landmarks.

Beautiful sandy beaches, such as this one at Montevideo, line Uruguay's Atlantic coast. Thousands of holiday-makers flock to the country's many coastal resorts each year.

In general, rural Uruguayans have a lower standard of living than do urban Uruguayans. As a result, many rural people move to the cities in search of a better life.

Clothing. Most Uruguayans dress much as people do in most Western countries. Many gauchos still wear at least part of the traditional gaucho costume, which includes a flat, wide-brimmed hat; a blanket-like poncho; and baggy trousers tucked into boots.

Food and drink. Uruguayans eat much meat, especially beef. A favourite Uruguayan meal is a gaucho speciality called *parrillada criolla.* A typical version consists of a mixture of barbecued *chorizos* (sausages), *riñones* (kidneys), and strips of beef. Italians who settled in Uruguay introduced such pasta dishes as spaghetti and lasagna. Uruguay's national beverage is a kind of tea called *yerba maté* or simply *maté.* It is traditionally sipped through a silver straw from a gourd.

Recreation. Soccer is the most popular sport in Uruguay. Many Uruguayan children begin playing soccer as soon as they can walk. Soccer games draw huge crowds to stadiums in the cities. Other popular sports include basketball and rugby. Gaucho rodeos, called *domos,* attract many spectators. Uruguayans spend much time at the magnificent beaches along the country's Atlantic coast. Thousands of holiday-makers flock to Punta del Este and other coastal resorts each year.

Religion. About two-thirds of all Uruguayans belong to the Roman Catholic Church. However, many of them do not actively practise their religion. Uruguay also has small numbers of Protestants and Jews.

Education. About 95 per cent of all Uruguayans 15 years of age or older can read and write. The government provides free public schooling up to university level. Uruguay also has many private schools, which charge tuition fees. The law requires children from the age of 6 to 15 to attend school, and almost all Uruguayan children complete the requirement. Most rural areas have primary schools only. Rural children must go to nearby cities or towns to go to secondary school. The University of the Republic in Montevideo is Uruguay's only university. It has about 35,000 students. Other higher education facilities include a teacher training institute and a nationwide system of vocational schools.

The arts. Uruguay has made major contributions to the arts in Latin America. During the 1800's, the Uruguayan painter Juan Manuel Blanes became well known for his dramatic portrayals of historical events. Pedro Figari achieved international fame during the early 1900's for his paintings of life in Montevideo and the countryside. The Uruguayan essayist José Enrique Rodó greatly influenced Latin American thought. His best-known work, *Ariel* (1900), expresses his opposition to materialistic ways of life. The works of Horacio Quiroga, published during the early 1900's, established him as a master of the short story.

Legends of the free-spirited gaucho have inspired much of Uruguay's folk music, art, and drama. Carved maté gourds, a traditional Uruguayan handicraft, often show scenes of gaucho life.

Land

Uruguay covers 177,414 square kilometres. The Uruguay River forms the country's western border with Argentina. Brazil lies to the north and east. The Atlantic Ocean and the Río de la Plata, an *estuary* (sea inlet) of the Atlantic, border Uruguay in the south. Uruguay can be divided into two major land regions: (1) the coastal plains and (2) the interior lowlands. The lowlands occupy about four-fifths of the country.

The coastal plains extend in a narrow arc along the Uruguay River, the Río de la Plata, and the Atlantic Ocean. They cover about a fifth of Uruguay. But most of the nation's population is concentrated in this region, especially along the southern coast. Montevideo lies on the coast near the point where the Río de la Plata and the Atlantic meet. Small family farms and large plantations occupy much of the western and southwestern coastal plains, which have Uruguay's richest and deepest soil. Beaches, sand dunes, and lagoons make up the Atlantic shore, which has many popular resorts.

The coastal plains of western and southwestern Uruguay have the country's richest soil. Wheat and other crops are grown on the small family farms and large plantations that occupy much of the area.

The interior lowlands cover most of Uruguay. Vast, grass-covered plains and hills and numerous rivers and streams make this area an ideal place for raising livestock. Sprawling ranches occupy most of the region, and small cities and towns dot the countryside.

The Río Negro, the largest river in the interior, flows southwestward through the heart of the lowlands. A dam on the river formed Uruguay's only large lake, Lake Rincón del Bonete. A long, narrow chain of highlands curves across the interior from the Brazilian border almost to the southern coast. Uruguayans call these highlands *Cuchilla Grande* (Big Knife) because knifelike formations of rock jut through the soil on many of the ridges. The highest point in Uruguay, Mirador Nacional, also called Cerro de las Animas, rises 501 metres in the Cuchilla Grande.

Climate

Uruguay has a mild, humid climate that varies little from one area to another. The country lies south of the equator, and so its seasons are opposite those in the Northern Hemisphere. Temperatures in Montevideo average 11° C in July, the coldest month, and 23° C in January, the warmest month.

Uruguay receives about 102 centimetres of rain annually. The rain generally falls regularly throughout the year. However, Uruguay occasionally experiences droughts.

Economy

Uruguay has a developing economy based largely on agriculture. Service industries and manufacturing account for 88 per cent of Uruguay's *gross domestic product* (GDP)—that is, the total value of all goods and services produced in the country yearly. But agricultural products provide Uruguay with most of its export income. Uruguay's most valuable natural resource is its land. The country's grasslands provide excellent natural pasture for livestock. Uruguay's leading manufacturing industries process beef, hides, and wool.

Most of Uruguay's businesses and industries are privately owned. However, the national government controls all utilities, much of the country's transportation industry, and some manufacturing firms.

Service industries account for 68 per cent of Uruguay's GDP and employ 65 per cent of the nation's work force. Government agencies have the greatest number of service industries workers. Tourism, another leading employer, thrives along Uruguay's Atlantic coast. Many Uruguayans have jobs in hotels, restaurants, and shops at seaside resorts. Others are employed by banks, health care facilities, and schools, and by firms in such fields as transportation and communication.

Manufacturing accounts for 20 per cent of Uruguay's GDP and employs 19 per cent of all workers. Meat packing and processing is the leading industry. Other manufactured goods include leather goods, textiles, beer, cement, and tyres. Most of the nation's industrial plants lie in and around Montevideo.

Agriculture accounts for 12 per cent of Uruguay's GDP and employs 16 per cent of the nation's workers. The raising of livestock is the leading source of farm income. Cattle and sheep estancias occupy about four-fifths of Uruguay's total land area. The larger ranches cover more than 2,000 hectares.

Farmers raise such crops as maize, potatoes, sugar beet, sugar cane, and wheat in the fertile soil along the Uruguay River and the Río de la Plata. Rice is grown in irrigated fields in the east. Most farms have modern mechanical equipment. But the poorest farmers use ox-drawn ploughs and old-fashioned methods.

Mining. Uruguay has few mineral resources. Construction materials, such as gravel, sand, and stone, are the leading mineral products.

Fishing. A small government-supported fishing fleet catches anchovy, croaker, hake, and weakfish off Uruguay's Atlantic coast. Most of the catch is exported.

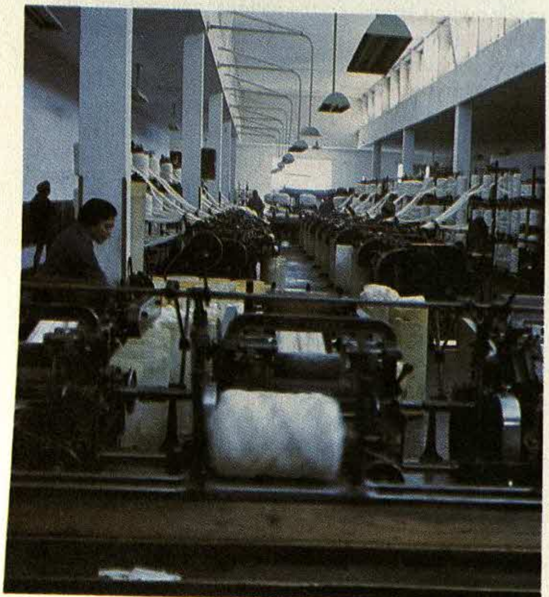
Energy sources. Uruguay has no deposits of coal, petroleum, or natural gas, and thus must import large quantities of fuel. The country depends almost entirely on hydroelectric power for its electricity. Power plants on the Uruguay River and the Río Negro supply electricity to all parts of the country.

Trade. Beef, hides, live cattle and sheep, vegetable products, wool, and woollen textiles rank as Uruguay's leading exports. Major imports include appliances, chemical products, machinery, metal goods, and petroleum. Uruguay trades mainly with Argentina, Brazil, the United States, and western European nations.

Transportation and communication. Good roads link all parts of Uruguay. The country's railway system, which is owned and operated by the government, is old and inefficient. Most Uruguayans rely on buses for transportation between cities and towns. Uruguay has an excellent government-operated bus system that serves the entire nation. A number of private companies also offer bus services.

Montevideo serves as Uruguay's major ocean port. The main international airport is located near Montevideo. PLUNA, a government-owned national airline, flies within Uruguay and to some foreign countries.

Almost all Uruguayan families own a radio, and there is about one television for every four people. Uruguay has about 24 daily general interest newspapers. The largest dailies are *El País* and *El Día* in Montevideo. The Constitution guarantees freedom of the press.



Yoram Lehmann from Peter Arnold

Textile manufacturing, especially the production of wool fabrics, is one of the leading industries in Uruguay. Most textile mills are located in and around Montevideo.

History

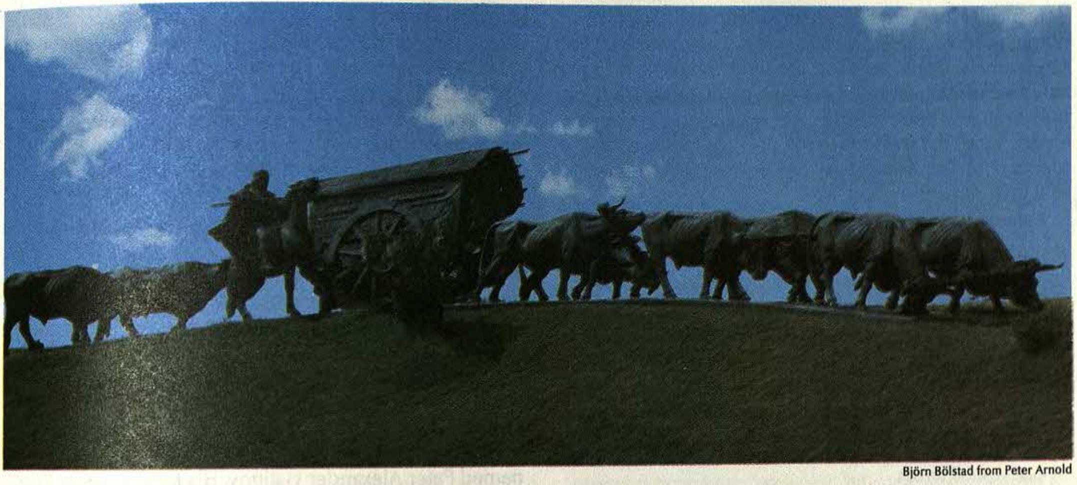
Early days. American Indians were the first people to live in what is now Uruguay. They gathered wild fruit and seeds and hunted game for food. The Charrúa Indians, the largest group, were a warlike tribe. In 1516, the Spanish navigator Juan Díaz de Solís became the first white person to land in Uruguay. But when he and part of his crew went ashore, the Charrúas killed them. Because Uruguay lacked gold and other riches, it attracted few other Europeans until the later 1600's.

Colonial years. In 1680, Portuguese soldiers from Brazil established the town of Nova Colonia do Sacramento (now Colonia) on the Río de la Plata, across from the Spanish settlement of Buenos Aires, Argentina. Spanish colonists founded Montevideo in 1726 in an effort to check Portuguese expansion in Uruguay. Spanish and Portuguese forces battled for control of the region during the 1700's. By the 1770's, the Spaniards had settled most of Uruguay. In 1777, they attacked Colonia and drove the Portuguese out of the country. Uruguay became part of a Spanish colony called the Viceroyalty of La Plata, which also included Argentina, Paraguay, and parts of Bolivia, Brazil, and Chile (see **Argentina** [map: In 1776]). During the colonial period, almost all of Uruguay's Indians were killed in battles with the Europeans, died of European diseases, or fled to the interior of the continent.

Independence. During the early 1800's, a soldier named José Gervasio Artigas organized an army to fight for independence from Spain. In 1811, Artigas and his forces laid siege to Montevideo. Just when they had almost defeated the Spaniards, Portuguese troops from Brazil attacked both the Spanish and Uruguayan armies. Rather than submit to either Spanish or Portuguese rule, Artigas led his forces and thousands of Uruguayans into the countryside of neighbouring Paraguay and Argentina, leaving much of Uruguay abandoned. The Spanish surrendered Montevideo to troops from Buenos Aires in 1814. This surrender permanently ended Spanish control of Uruguay. In 1815, Artigas and his forces returned to capture Montevideo for Uruguay. But, in 1816, Portuguese troops again attacked the Uruguayans. After four years of bitter warfare, the Portuguese annexed Uruguay to Brazil and forced Artigas into exile.

In 1825, a group of Uruguayan patriots called "The Immortal Thirty-three" revolted against Brazil and renewed the struggle for independence. Within a few months, their armies held much of the countryside. Argentina supported the patriots in the war against Brazil. The United Kingdom (UK) intervened in the war because a Brazilian blockade of Montevideo and Buenos Aires interfered with UK trade. In 1828, because of the UK's intervention, Brazil and Argentina recognized Uruguay as an independent republic. Uruguay adopted its first constitution in 1830. José Fructuoso Rivera, one of the patriot leaders, became the nation's first president.

Civil war. Manuel Oribe succeeded Rivera as president in 1835. But the next year, Rivera attempted to regain power by leading a revolt against Oribe. Most of Rivera's followers, known as the Colorados, came from the cities. Oribe's forces, the Blancos, were mainly rural



Björn Bölstad from Peter Arnold

The Spanish pioneers who settled in Uruguay during the 1700's and 1800's are honoured by a life-sized bronze monument that stands in Montevideo's Batlle Park. The monument, which portrays the ox-drawn *carreta* (cart) the pioneers used, was created by the Uruguayan sculptor José Belloni.

landowners. The two groups, which developed into Uruguay's two major political parties, fought for control of Uruguay for 16 years. Finally, in 1852, the Colorados defeated the Blancos.

Struggles for power continued during the mid-1800's, as control of the government passed between the Colorados and Blancos. Foreign governments often interfered in Uruguay's affairs by supporting one party or the other in uprisings and rebellions. In 1865, the Colorados gained control of the government with the help of Brazil. Paraguay supported the Blancos in an attempt to regain power. Uruguay, Brazil, and Argentina then formed an alliance and fought against Paraguay. The War of the Triple Alliance ended with the defeat of Paraguay in 1870. By the end of the war, the Colorados had clearly become the dominant political party, mainly due to the rapid growth of Montevideo as Spanish and Italian immigrants poured into Uruguay. A series of Colorado leaders headed the government during the late 1800's. Some of them ruled as dictators.

Reforms in the early 1900's. In 1903, José Batlle y Ordóñez was elected president of Uruguay. Batlle believed strongly in democratic principles and social justice. Under his leadership, the ruling Colorado Party passed wide-ranging laws that established free education, minimum wages and protection of workers' rights, credit to farmers, free medical care for the poor, and other social welfare programmes. The government took control of public utilities and many manufacturing firms, and established national banks and railways. Batlle and his successors made Uruguay into a model of democracy, social reform, and economic stability.

National Council government. Uruguay severed diplomatic relations with Germany, Italy, and Japan in 1942 and declared war on the Axis nations three years later. But no Uruguayan troops fought in World War II. Uruguay's exports of meat and wool soared during the war, helping to finance a number of new social programmes. Uruguay became a charter member of the United Nations in 1945.

In 1951, Uruguay ratified a new constitution that abolished the presidency and established a nine-member National Council of Government. The council allowed the Colorado and Blanco parties to share power. Uruguay's economy began to decline during the early 1950's. Foreign trade decreased due to a loss of markets for agricultural exports, while the cost of the country's social programmes rose rapidly. Inflation became a serious problem. The National Council proved inefficient in dealing with these troubles. A new constitution reestablished a presidential government in 1967.

Military government. Worsening economic problems caused widespread unrest in Uruguay during the late 1960's and early 1970's. Antigovernment terrorist groups became active. One group, the Tupamaros, carried out kidnappings and murders of Uruguayan and foreign officials.

Terrorist violence increased after Juan Maria Bordaberry became president in 1972. He declared a state of war against the Tupamaros, and the guerrilla movement was crushed within a few months. In 1973, in response to growing public unrest and economic problems, military leaders took control of the government and forced President Bordaberry to dissolve the national legislature. They suspended the Constitution and formed a Council of State to rule Uruguay by decree. Bordaberry was a member of the council, but the military completely dominated the government. The military leaders removed Bordaberry from office in 1976 and appointed Aparicio Mendez president. General Gregorio Alvarez succeeded Mendez in 1981.

Recent developments. Julio María Sanguinetti, the leader of the Colorado Party, was elected president in 1984. When he took office in 1985, he faced major economic problems. Export income had dropped sharply, and foreign debt had soared. Inflation and unemployment had increased, lowering the standard of living for many Uruguayans. In 1989, the Blanco Party won presidential and congressional elections for the first time since 1962. Luis Alberto Lacalle of the Blanco Party became president in 1990.

Lacalle focused on reducing the government's budget deficit and shrinking Uruguay's foreign debt. His economic programme included smaller wage increases for government employees and the *privatization* (sale to private owners) of some state-owned companies. Trade unions opposed these policies and organized a series of strikes by all the workers in the country. In a special election in 1992, voters rejected plans to privatize several government-owned firms.

Related articles in ***World Book*** include:

Artigas, José Gervasio
Gaucho
Montevideo
Río de la Plata
Rodó, José Enrique
Salto
Uruguay River

Outline

- **I. Government**
  - A. National government
  - B. Local government
  - C. Politics
  - D. Courts
  - E. Armed forces
- **II. People**
  - A. Population and ancestry
  - B. Languages
  - C. Way of life
  - D. Clothing
  - E. Food and drink
  - F. Recreation
  - G. Religion
  - H. Education
  - I. The arts
- **III. Land**
  - A. The coastal plains
  - B. The interior lowlands
- **IV. Climate**
- **V. Economy**
  - A. Service industries
  - B. Manufacturing
  - C. Agriculture
  - D. Mining
  - E. Fishing
  - F. Energy sources
  - G. Trade
  - H. Transportation and communication
- **VI. History**

Questions

Who were the ancestors of most of today's Uruguayans?
How does the Uruguayan economy depend on agriculture?
What social reforms did President José Batlle y Ordóñez introduce in Uruguay during the early 1900's?
What are *gauchos*? How have they influenced Uruguayan culture?
What are Uruguay's two major political parties? What types of political views do they each support?
Who were "The Immortal Thirty-three"?
Where do most of Uruguay's people live?
What conditions led to the military take-over of Uruguay's government in 1973? When was civilian rule restored?
What is Uruguay's most popular sport?
What was the National Council of Government?

Uruguay River is part of the great Paraná and La Plata river system of South America. The Uruguay rises in the state of Santa Catarina in southern Brazil and flows west, and then south for about 1,600 kilometres. It empties into the bay of the Río de la Plata. The Uruguay forms part of the boundary between Brazil and Argentina, and all the boundary between Uruguay and Argentina. Before it joins the Río de la Plata, the river becomes a lake from 6 to 11 kilometres wide. See **Uruguay** (map); **Brazil** (map).

U.S.S.R. See **Union of Soviet Socialist Republics.**

Ustad Fateh Ali Khan (1938-) is a distinguished Pakistani classical singer. He was born in Patiala, East Punjab, into a family of great musical tradition. Trained by his father, he started singing in concerts with his elder brother at the age of 10.

Ustad Fateh Ali Khan is acknowledged as the finest classical singer in Pakistan. He is a superb representative of the *Patiala Gharana,* a style of singing enhanced by his rich, vibrant tremolo and cultured tone. The style is rich, fresh, and in line with the tradition of South Asian music. Ustad Fateh Ali Khan has produced and performed more than 100 records. In 1969, he gained the coveted Pride of Performance Award, Pakistan's highest award in the field of performing arts. This was in recognition of his outstanding contribution to classical music.

Ustinov, Sir Peter (1921-), is a British actor, playwright, and producer. He became a brilliant mimic and achieved much of his success in comedy. Among the plays that he wrote and appeared in were *The Love of Four Colonels* (1951) and *Romanoff and Juliet* (1956). He also acted in films, including *Billy Budd* (1962) and *Private Angelo* (1949), both of which he directed, and *Death on the Nile* (1978). Ustinov was born in London and named Peter Alexander Ustinov. His family was of Russian descent. Ustinov's autobiography, *Dear Me!,* was published in 1977. He was knighted in 1990.

Usumbura. See **Bujumbura.**

Usury is the charging of interest on money loans at a high rate. In some countries, usury is defined as charging interest above a legal maximum rate. The person or institution charging more than the maximum legal rate is a *usurer.*

In Biblical times, all payments for the use of money were regarded as usury, and were forbidden. In general, people regarded interest and usury as synonymous until the late Middle Ages, because most of the borrowers were poor people who needed money to obtain the necessities of life.

The Industrial Revolution brought demand for large amounts of capital to invest in railways, textiles, engine works, and shipbuilding. It became accepted practice to pay interest for the use of borrowed funds. The term *usury* no longer meant interest. It came to be associated with excessive charges.

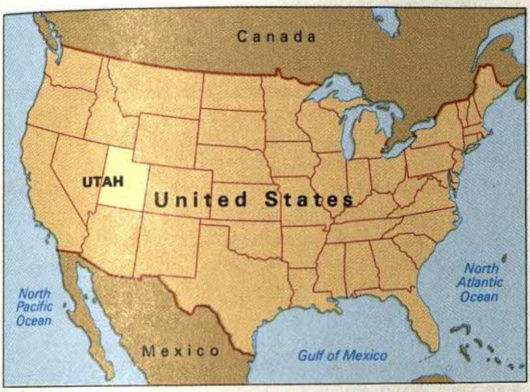
Ceiling rates that licensed dealers may charge have risen over time to reflect rising interest rates. The rate usually varies with the amount of money borrowed. Service charges and discounts may make the real interest rate higher than the rate advertised. Many countries have laws requiring lenders to state clearly the actual annual interest on loans. In many Islamic countries, interest is not charged. The Quran, the holy book of Muslims, forbids charging interest on loans. Instead of interest, Islamic banks usually make service or taxation charges on loaned money.

See also **Finance company; Interest.**

Utah (pop. 1,727,784) is a state in the Rocky Mountain region of the United States. About 70 per cent of Utah's population belongs to the Church of Jesus Christ of Latter-day Saints. The members of that church are called *Mormons.* Salt Lake City, Utah's capital and largest city, is the headquarters of the church. The city is also a centre of banking and industry.

Land. Utah covers 219,889 square kilometres. The state's beautiful and varied landscape includes scenic canyons, towering Rocky Mountain peaks, and vast areas of deserts. Water in the Great Salt Lake, in northern Utah, is saltier than ocean water.

Kings Peak, the highest elevation in the state, rises



Utah, a state in the Rocky Mountain region of the United States, includes desert areas as well as mountain peaks.

4,123 metres in northeastern Utah. The lowest elevation is 610 metres, at Beaverdam Creek in the southwestern corner of the state. Temperatures in Utah average 23° C in July, and −4° C in January.

Economy. Service industries employ about three-fourths of Utah's workers. Among the state's leading employers are business services, education, and retail trade. Utah's national parks, ski resorts, and other outdoor attractions draw many tourists.

An electronics industry is the central feature of manufacturing in Utah. The state is also a major U.S. producer of rocket propulsion systems for missiles and spacecraft. Utah has a large mining output that includes petroleum, coal, and natural gas. Cattle ranching is the state's chief agricultural activity.

History. Indians probably lived in the Utah region several thousand years ago. Spanish explorers who arrived in 1776 found Gosiute, Paiute, Shoshone, and Ute Indians.

Mormon pioneers led by Brigham Young settled the Utah region in 1847. They called the region *Deseret,* a Mormon word that means *honey bee.* It stands for hard work and industry. Utah's nickname is the *Beehive State.* In 1850, the U.S. Congress named the territory *Utah* after the Ute Indian tribe. Utah became a state on Jan. 4, 1896.

During the 1950's and 1960's, Utah changed from an agricultural to an industrial state. During the early 1980's, service industries and tourism expanded.

See also **Great Salt Lake; Mormons; Young, Brigham.**

Utamaro (1753-1806) was a leading Japanese printmaker. He turned public taste in the direction of bold drawing, striking poses, and unusual colour contrasts. His beautiful women or pairs of lovers are tall and graceful. He often showed them only from the waist up, and drew faces and hands with great elegance under masses of jet-black hair. Toward the end of his life, he turned for novelty to exaggerations and distortions, which some of his followers carried even further. Utamaro was born in Kawagoe, Japan. See also **Japanese print** (picture).

Uterus, or *womb,* is a hollow organ of the female reproductive system in which an unborn baby develops. The organ is near the base of the abdomen. In a woman who is not pregnant, the uterus resembles an upside-down pear in shape and is about the size of a fist. The bottom of the uterus consists of a necklike opening called the *cervix,* which leads into the vagina. At birth, a baby passes down through the cervix and the vagina and then out of the woman's body.

Each month during a woman's childbearing years, blood vessels, glands, and cells build up in the lining of the uterus. This process prepares this organ to receive a fertilized egg. If fertilization does not occur, the built-up lining is discharged during menstruation. If fertilization takes place, the fertilized egg attaches itself to the lining of the uterus. The egg develops into an embryo, and tissues from the uterus and the embryo form a disc-shaped organ called the *placenta.* The placenta provides the unborn baby with food and oxygen and carries away its waste products (see **Placenta**).

The uterus expands to about 24 times its normal size during pregnancy. During childbirth, the muscles of the uterus contract and force the baby out of the mother's body. A second wave of contractions then expels the placenta. The uterus returns to normal size a few weeks after the birth of the baby.

See also **Endometriosis; Hysterectomy; Menstruation; Reproduction.**

Utica, an ancient North African city, was the oldest Phoenician colony in the western Mediterranean Sea. It stood about midway between present-day Tunis and Bizerte, Tunisia. According to legend, Utica was founded in 1101 B.C. But scholars now believe it was founded in the 700's B.C. Utica was an important seaport, but its site is now about 11 kilometres from the sea. Some ruins of the city remain.

At first, Utica and the neighbouring colony of Carthage were almost equal in power. With Motya, a colony in western Sicily, they gave Phoenicia control of the Mediterranean passage to the Straits of Gibraltar, threatening Greek sea trade.

Carthage later became an independent power, and began to challenge Rome by the 300's B.C. Utica fought on the side of Rome during the Third Punic War (149-146 B.C.) between Rome and Carthage. Rome won the war and made Utica capital of its new province of Africa. Utica was conquered by Arabs in the A.D. 600's.

Utilitarianism is a theory of morality that associates the rightness of an act with its consequences. It was developed in the late 1700's and 1800's by the British philosophers Jeremy Bentham, James Mill, and John Stuart Mill.

Utilitarians believe that what makes an act morally right is the fact that it leads to the best consequences. In contrast, according to most traditional codes, such as the Ten Commandments, acting morally involves following certain principles, even when doing so leads to bad effects. Utilitarians wanted to replace such a strict attachment to rules with a flexible code that allowed people to perform whatever act would have the best results.

Some utilitarians differ in their beliefs about what makes results good or bad. Bentham believed that only pleasure or happiness is good in itself, while pain or unhappiness is the only basic evil. The right act produced the greatest happiness for the greatest number. Other utilitarians claim that other things besides pleasure are good, such as knowledge, love, and freedom.

Bentham tried to devise a method to measure the value of actions. He extended his theory to politics, claiming that government should promote the well-being of its citizens. His theory is an early form of cost-benefit analysis, a method now often used in politics and economics.

See also **Bentham, Jeremy; Mill** (family).

Utopia is the name commonly given to an imaginary land where everything is supposed to be perfect. The name *utopia* comes from the Greek words *ou* and *topos,* meaning *no place.* The name refers particularly to a type of society with ideal economic and social conditions. People often apply the adjective *utopian* to plans of reform that they consider to be impractical and visionary.

The word *utopia* was used as the title of a famous book by Saint Thomas More. *Utopia* was first published in Latin in 1516 and was translated into English in 1551. It is partly in the form of a dialogue. The book gives More's views on the ideal government. But, like most writings on utopias, it also criticizes social and economic conditions of More's times.

Several other books have presented an imaginary ideal state of society. One of the first books describing a utopia was Plato's *Republic* (375 B.C.?). More recent utopias are described in Samuel Butler's *Erewhon,* which almost spells *nowhere* backwards (1872), and Edward Bellamy's *Looking Backward* (1888).

See also **Bellamy, Edward; Communal society; More, Saint Thomas; Plato; Wells, H. G.**

Utrecht (pop. 231,769; met. area 494,898) is a Dutch city that lies along the Rhine River, about 35 kilometres southeast of Amsterdam (see **Netherlands** [map]). Utrecht has many medieval churches and the tallest church tower in the Netherlands. The tower, called the *Domtoren,* is 112 metres high. The University of Utrecht is one of the country's largest universities. The city is the centre of the Dutch railway network. Industries include metalworking, heavy construction, and food processing.

Much Dutch history centres around this interesting old city. In 1579, the seven northern Protestant provinces united in Utrecht. The nation of the Netherlands grew out of this union. A treaty that helped end the War of the Spanish Succession was signed at Utrecht in 1713 (see **Utrecht, Peace of**).

Utrecht, Peace of, was one of the great international peace settlements of history. It ended the War of the Spanish Succession (1701-1714) and established a balance of power in Europe. The settlement consisted of the Treaty of Utrecht, the Treaty of Rastatt, and the Treaty of Baden.

The death of King Charles II of Spain in 1700 led to the War of the Spanish Succession. Charles left a will that gave the Spanish crown to a French prince, Philip of Anjou. Philip was the grandson of King Louis XIV of France, and so other European countries feared that France might add Spain's empire to its own. In the war, France fought against the Grand Alliance, consisting of Austria, England, Prussia, the Netherlands, and smaller states in the Holy Roman Empire. Finally, in 1712, representatives of all the participants met in Utrecht, the Netherlands, to formally discuss peace terms.

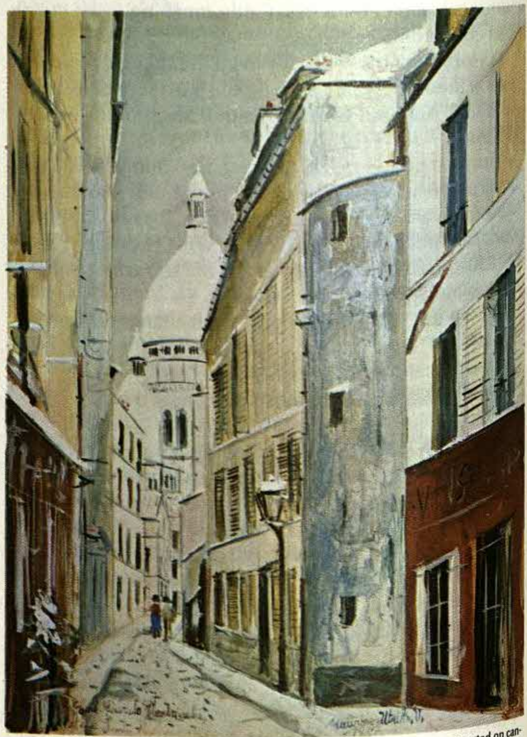
The Treaty of Utrecht, signed in 1713, marked the declining power of France and the growing worldwide strength of Great Britain. The treaty recognized Philip as king of Spain, but France agreed that Spain and France would never be united under one ruler. Britain gained the Spanish colonies of Gibraltar and Minorca and received a contract to supply all the Spanish colonies in America with African slaves. In North America, France gave Britain the Hudson Bay Territory, Newfoundland, and the Nova Scotia region of Acadia.

Holy Roman Emperor Charles VI refused to sign the Treaty of Utrecht. He claimed that he was the heir to the Spanish throne. Fighting between France and Austria, the chief state in the Holy Roman Empire, continued until 1714. That year, the two nations signed the treaties of Rastatt and Baden, which confirmed most of the terms of the Treaty of Utrecht.

See also **Acadia; Succession wars.**

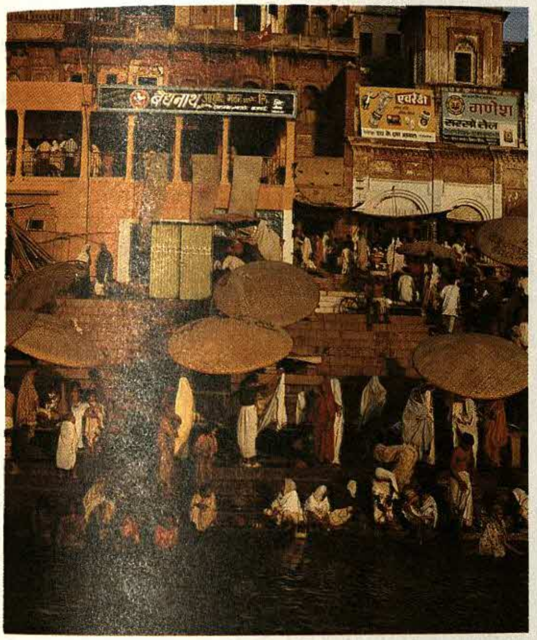
Utrillo, Maurice (1883-1955), was a French artist known for his paintings of Paris street scenes. His favourite subject was the Montmartre district, with its steep streets and picturesque windmills. Most of Utrillo's paintings have a melancholy feeling. The streets are empty, or a few lonely figures wander through them. Newly fallen snow and leaden skies often lend a gloomy air. He increased the gloominess by the use of deep perspectives. From 1908 to 1914, Utrillo used white and off-white colours with soft, warm ones. His later paintings have brighter colours.

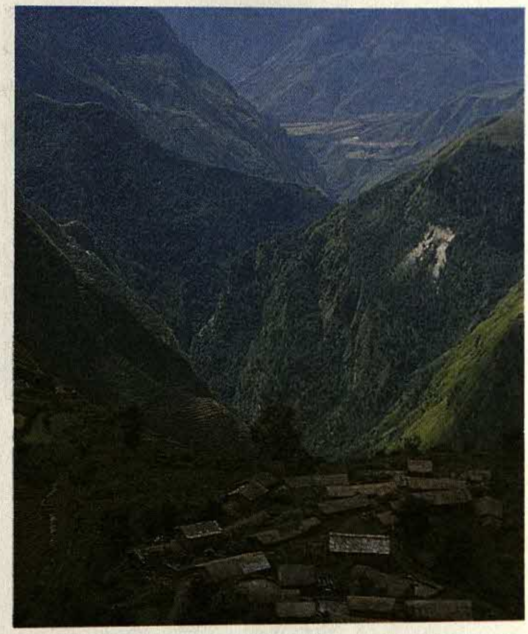
Utrillo was born in Paris. His mother was Suzanne Valadon, a well-known painter and artists' model. She introduced him to painting, but he was essentially self-taught. Utrillo painted his scenes from memory or used picture postcards as aids.



Sacré Coeur de Montmartre (1937), a painting on paper mounted on canvas; Indianapolis Museum of Art, Indianapolis, Indiana, U.S.A.

A typical Utrillo painting portrays lonely figures on the narrow, twisting streets of Montmartre, a district of Paris.





Varanasi, in eastern Uttar Pradesh, attracts many Hindu pilgrims, who bathe in the sacred Ganges (Ganga) River. A village near Dumak in Kedarnath, *right,* nestles among the majestic mountains that form part of the attractive scenery of Uttar Pradesh.

Uttar Pradesh is a state in northern India. Its name means "Northern Provinces." Although Uttar Pradesh is only India's fourth largest state in area, it is the largest state in population. For the total population of Uttar Pradesh, see the *Facts in brief* table with this article.

Uttar Pradesh is one of the great historical and religious centres of India. The sacred Ganges (Ganga) River is the physical and spiritual life source of the region. Varanasi (Benares), the holiest city in India, is where every devout Hindu hopes to die and be cremated. Mathura, south of Delhi, is regarded as the birthplace of the Hindu god Krishna.

Much of the state has fertile soil and good rainfall. But despite these natural advantages, Uttar Pradesh is one of the poorest states in India, largely because of its huge population.

People and government

People. The majority of the population are Hindu, but 15 per cent are Muslim. Most Muslims live in towns. Most Hindus live in rural areas. Buddhism has a shrine at Sarnath, near Varanasi, where Buddha first preached his message. Followers of Buddhism, Jainism, Christianity, and Sikhism together constitute less than 1 per cent of the total population of Uttar Pradesh.

The main language spoken in the state is Hindi. But many people use Urdu as a common language for business. There are also numerous local dialects.

Government. The regional head of state is the governor, who is appointed by the president for a five-year term. The 108-seat legislative assembly is at Lucknow, the state capital. The chief minister is elected from the regional legislature. The state took its present form and name in 1950, when India declared itself a republic.

Uttar Pradesh has 85 elected members in the *Lok Sabha* (lower house) and 34 nominated representatives in the *Rajya Sabha* (upper house) of the Indian national parliament.

There are 57 local government districts in the state. An official known as the district magistrate and collector is responsible for administration at district level. At village level, there is the *gram panchayat* (council) system.

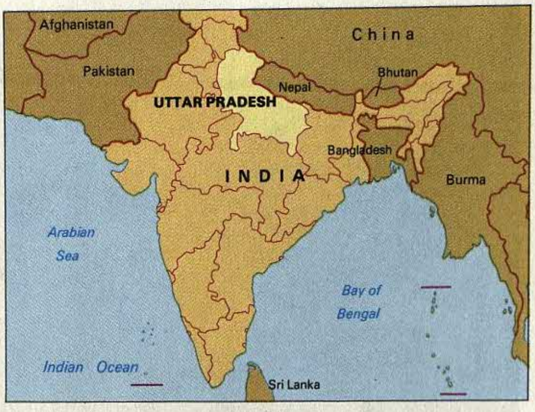
Economy

Agriculture. Farming is the main occupation of three-quarters of the working population. Many peasants have farms that are too small for efficient agriculture. The main problem is the pressure of population on land sources. The soils are fertile and there is good rainfall over nearly all the region. Irrigation facilities bring water to about one-third of the cropped area.

Wheat, rice, maize, millet, and pulses, such as beans, peas and lentils, are the major food crops. Uttar Pradesh is one of the country's major producers of sugar cane. Cotton, oilseeds, jute, potatoes, and tobacco are other important cash crops.

Facts in brief about Uttar Pradesh

Population: *1991 census*—138,760,417.
Area: 294,411 km².
Capital: Lucknow.
Largest cities: Kanpur, Lucknow, Varanasi, Agra, Allahabad, Meerut, Bareilly, Ghaziabad.
Chief products: *Agriculture*—cotton, maize, oil seeds, potatoes, pulses, rice, sugar cane, wheat. *Manufacturing*—flour milling, sugar and vegetable oil refining, textiles, village handicrafts. *Mining*—coal, dolomite, limestone, magnesite, silica, soapstone.



Uttar Pradesh is a large inland state in northern India which includes about one-sixth of the country's population.

In the Himalaya, there has been extensive deforestation, caused by the local population and by commercial logging. There is not enough timber to meet demands and there is also a shortage of firewood, which is the most important cooking fuel. Fast-growing varieties of tree are planted to provide fuel, fodder, and timber. As part of national and state projects for *sericulture* (the production of silk fibre), large-scale planting of mulberry trees is under way across the state. Mulberry trees provide food for the caterpillars of the silkworm moth.

Manufacturing. Cotton mills were first established in Kanpur in 1869, making it one of the older factory cities of India. It has become one of the greatest industrial cities, with woollen and leather industries, cotton, flour, and vegetable-oil mills, sugar refineries, and chemical works. The state government has established cement factories near Mirzapur, precision instrument factories around Lucknow, a chemical plant at Bareilly, a pharmaceutical factory at Rishikesh, and a diesel locomotive factory at Varanasi. It has also introduced fertilizer factories at Gorakhpur and Allahabad, telephone industries at Genda Naimi and Rae Bareli, electronics industries at Ghaziabad, and scooter factories at Lucknow, as well as an oil refinery at Mathura. Sericulture is a rapidly developing industry.

Mining. Uttar Pradesh does not have rich mineral resources. Mines and quarries produce limestone, silica, magnesite, and phosphatic shale. Soapstone, copper, lead, zinc, marble, and bauxite are also found in the state. There are coalfields in Mirzapur district. Electricity produced by coal-burning power stations is the most important source of energy.

In the late 1980's, construction started on schemes to harness the Himalayan rivers for hydroelectric power.

Transportation. There is an extensive road and rail network throughout the state. Because of the size of the population, this network is constantly under pressure. The main railway junctions include Agra, Allahabad, Gonda, Gorokhpur, Jhansi, Kanpur, Lucknow, Mathura, Moradabad, and Varanasi. The major defect of the rail system is that there are two different *gauges* (widths of track). Railways do not extend into the hills. The railheads are Kathgodam, Ramnagar, Kotdwara, Hardwar, and Dehra Dun. A good road network extends to the border with Tibet and China to facilitate troop movements. Air routes link several large towns with Delhi and with one another.

Tourism. Uttar Pradesh contains many famous tourist sites. They include ancient monuments, such as the Taj Mahal at Agra (see **Taj Mahal**). Tourists also visit monuments of Mughal culture at Lucknow, hill resorts at Mussorie and Naini Tal, religious centres at Kedarnath, Badrinath, and Kushinagar (Buddhist centre), and Corbett National Park. Tourists also enjoy skiing, trekking, rock climbing, and river rafting through the state's magnificent scenery. Thousands of pilgrims visit Allahabad and Varanasi to bathe in the waters of the Ganges River, which Hindus consider to be sacred.

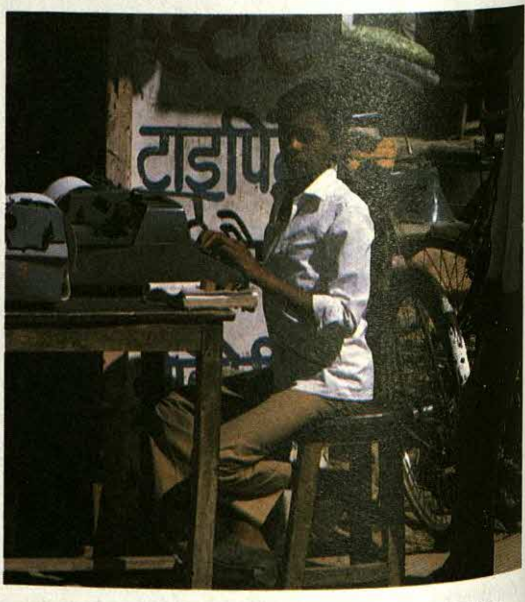
Land

Location and description. Uttar Pradesh is one of India's border states, sharing one-third of its northern boundary with Tibet and China and two-thirds with Nepal. The state shares internal borders with Himachal Pradesh in the northwest, and Haryana, the union territory of Delhi, and Rajasthan to the west. Madhya Pradesh lies to the south, and Bihar to the east.

Land features. About 75 per cent of Uttar Pradesh consists of plains, the rest being the Siwalik Hills and the Himalaya in the north and the Vindhya Hills and central plateau in the south. The great plain lies between two upland areas.

The Himalaya, or *Snowy Range,* consists of several different kinds of rocks, folded by the movement of continental plates. The process of uplift still continues at the rate of about 1.5 centimetres each year. The many peaks over 6,400 metres include Nanda Devi, Kamet, Trisul, Badrinath, Dunagiri, and Shivling. To the south of the main Himalayan region, the hills are lower and the valleys less deep.

The Siwaliks form a low range of hills running parallel



Working outdoors is possible for much of the year in Uttar Pradesh. The weather is mainly dry outside the monsoon months of June to September.

Tomb of Itimad ud Daulah is one of the impressive buildings that attract visitors to the city of Agra.

with the Himalaya. To the south is a region of coarse and loose gravels formed from the mountains. Further south is the *terai,* a belt of forest about 65 kilometres wide.

The Gangetic Plain is flat and mostly featureless. The Ganges and its tributaries have washed down silt and soils. These have formed rich beds of alluvium, up to 600 metres deep. The elevation of the plain gradually decreases from 365 metres in the northwest at Hardwar to 80 metres in the east at Varanasi.

The southern hill and plateau region runs along the southern edge of the state. It includes the Vindhya Hills in the southeast, which rise to more than 600 metres in places, and back onto the central Indian plateau.

Uttar Pradesh is a land of many rivers and the alluvial soils found over two-thirds of the state are extremely fertile. There are few areas where the salt content in the soil is too high for successful cropping. Soils in the hills tend to be thin, stony, easily drained, and with much lower fertility.

Climate. Except for the mountain region, the whole state has a tropical *monsoon* climate (see **Monsoon**). Winter (December to February) temperatures range from 7° C minimum to 27° C maximum. Summer (April to June) temperatures range from 22° C minimum to 42° C maximum, with occasional extremes of 45° C. A hot, dry wind often blows from the west.

The monsoon lasts from mid-June to mid-September, during which time the maximum temperature drops a few degrees, humidity increases, and 80 per cent of the annual rain falls. The eastern parts of the state receive between 100 and 200 centimetres of rain per year. Rainfall in the west is less, with some places receiving under 50 centimetres per year.

In the hill region of the north, the high peaks are permanently under snow. The daily and seasonal temperatures in this region are lower.

Animals and plants. High parts of the Himalaya in northern Uttar Pradesh have alpine vegetation and coniferous and deciduous forests of pine, spruce, and deodar. There are sal forests at lower levels. Most of the plains area is intensively cultivated. Mango trees are common. The south has open scrub and thorn forest.

Eight national parks and many sanctuaries have been set up to protect the local wildlife. Animals in these reserves include bear, deer, elephant, mountain goats, panthers, snow leopards, and wild boar. Small mammals such as flying squirrels, mongooses, porcupines, shrews, and sloths are common. The varied bird population includes parrots, pheasants, pigeons, vultures, and waterfowl. Fish are plentiful.

Rivers and lakes. The major river of Uttar Pradesh and northern India is the Ganges. It is not only sacred to the Hindu population, but also extremely valuable for irrigating large areas. Nearly all the other rivers in the region are part of the Ganges system. Second most important is the Jumna (Yamuna), which flows from the Garhwal Himalaya, through Delhi and Agra and joins the Ganges at Allahabad. The Ghaghra, the Gomti, the Ramganga, and the Kosi are other major rivers.

There are no lakes on the plains and only a few in the mountains. Of these, Naini Tal is the biggest. It lies 1,800 metres above sea level, and is 1.5 kilometres long and 300 metres wide. A hill resort has developed there.

History

Hindus believe that Uttar Pradesh is the birthplace of Rama and Krishna, the heroes of India's two great epic poems, the *Ramayana* and the *Mahabharata.* The region is associated with all the religions of India, and it contains important places of worship for Hindus, Jains, Buddhists, and Muslims. Buddha preached his first sermon at Sarnath, near Varanasi, and achieved *parinirvana* (spiritual release from the body) at Kusinagara. Varanasi was one of Uttar Pradesh's most ancient centres. As a great centre of culture, education, commerce and craftwork, the city was already about 1,000 years old when Buddha arrived there in 500 B.C.

From the 200's B.C., Uttar Pradesh was part of the Mauryan Empire. Later, various Hindu dynasties controlled the region. In the late A.D. 1100's, invading Turks established a Muslim empire called the Delhi Sultanate. It extended its influence over Uttar Pradesh.

From the mid-1500's, the Uttar Pradesh area became the political and cultural heart of the Mughal Empire. Varanasi, which had declined during Muslim rule from Delhi, underwent a cultural and religious revival under the emperor Akbar. Agra was for some time an imperial

Places to visit

Following are brief descriptions of interesting places to visit in Uttar Pradesh.

Agra has magnificent Mughal monuments, including the Taj Mahal, Moti Masjid, and the vast palace fort.

Allahabad. The massive red sandstone palace fort overlooks the sacred confluence of the Ganges and Jumna rivers.

Corbett National Park is home to elephants, deer, panthers, wild boar, crocodiles, jackals, and teeming bird life.

Fatehpur Sikri. Now deserted, the emperor Akbar's capital is a perfectly preserved example of a splendid Mughal city.

Lucknow has many beautiful parks and gardens, including the National Botanical Gardens. It is famous for embroidery work.

Mathura is, according to legend, the birthplace of Lord Krishna. It has a number of Hindu, Buddhist, and Jain temples.

Rishikesi is the starting point for treks to Hindu pilgrimage centres such as Badrinath, Kedarnath, and Gangotri.

Sarnath, where Buddha once preached, is a major Buddhist centre. The museum has an Ashokan pillar and lion capital.

Varanesi is one of the most important pilgrimage and tourist centres in India. It has more than 100 *ghats* (staircases) from which Hindu pilgrims bathe in the Ganges. The Golden Temple has more than 750 kilograms of gold plate on its towers. The Great Mosque of Aurangzeb is famous for its towering minarets.

The skyline of Lucknow, the capital of Uttar Pradesh, shows many features of Islamic architecture. Lucknow was an important cultural centre during the 1700's.

capital. In the 1600's, the emperor Shah Jahan ordered the building of the Taj Mahal there.

In the 1700's, with the decline of Mughal power, several independent kingdoms arose in Uttar Pradesh. Among the most important were Oudh and Varanasi. Lucknow, the capital of Oudh, was a cultural centre.

From 1765, British rule was extended into both Bengal and Uttar Pradesh. In 1836, the East India Company combined its possessions in Uttar Pradesh with Delhi and renamed the resulting area the Northwestern Province. In 1856, the British annexed the province of Oudh, thereby completing their takeover of Uttar Pradesh.

Resentment of British rule flared into violence in the Indian Revolt of 1857. Uttar Pradesh was the centre of this revolt, which began in Meerut and quickly spread to Lucknow, Kanpur, Agra, Allahabad, and Jhansi, but did not go far beyond the borders of the state. The British put down this uprising. After it, control of East India Company territories passed to the British government. In 1877, the British combined the northwestern provinces and Oudh to form what eventually became known as the United Provinces of Agra and Oudh.

During the 1900's, Uttar Pradesh was in the vanguard of the national movement for independence. All the nationalist movements—the Non-Cooperation movement, the Civil Disobedience campaign, and the Quit India movement—found enthusiastic support in the region. However, the burning of a police station by a mob in the village of Chauri Chaura, in which several policemen died, led to the suspension of the Non-Cooperation movement. Prominent nationalist leaders who were active in Uttar Pradesh included Mohandas Gandhi, Motilal Nehru, Madan Mohan Malaviya, and Purushottamdas Tandon.

Following Indian independence in 1947, Uttar Pradesh emerged in 1950 as the most populous and politically most influential state of the Indian union. Several of India's prime ministers were born in Uttar Pradesh, including Jawaharlal Nehru, Lal Bahadur Shastri, and Indira Gandhi. The Congress Party was for many years the most significant political group. In the state assembly and national elections of 1991, the Bharatiya Janata Party (BJP) won a majority of seats. In the same year, an earthquake in Uttar Pradesh caused many deaths.

In December 1992, tens of thousands of Hindu extremists, mobilized by the Bharatiya Janata Party (BJP), Bajrang Dal Party, and the Viwa Hindu Parishad (VHP) demolished the Babri mosque at Ayodhya, in Uttar Pradesh. Their action led to communal rioting and violence throughout India between Muslims and Hindus. The site is sacred to Hindus who believe it is the birthplace of the heroic god Rama. To restore calm, Prime Minister Rao pledged to rebuild the mosque and discuss the construction of a Rama temple nearby.

Related articles in ***World Book*** include:

Agra
Akbar
Allahabad
Buddha
Gandhi, Mohandas
Ganges River
Himalaya
India
Indian Revolt
Lucknow
Mahabharata
Ramayana
Taj Mahal
Varanasi

Outline

- **I. People and Government**
  - A. People
  - B. Government
- **II. Economy**
  - A. Agriculture
  - B. Manufacturing
  - C. Transportation
  - D. Tourism
- **III. Land**
  - A. Location and description
  - B. Land features
  - C. Climate
  - D. Animals and plants
  - E. Rivers and lakes
- **IV. History**

Uttlesford (pop. 63,900), the largest local government district in Essex, England, is a mainly agricultural area noted for wheat and barley. The district includes the historic town of Saffron Walden and the villages of Thaxted and Great Dunmow. Saffron Walden was once famous for wool, *saffron* (a dyestuff obtained from the crocus), and malt production. Its historic buildings include Audley End House, a mansion built in the 1600's. Stansted has an international airport.

Uxbridge. See Hillingdon.

Uzbekistan is a country in central Asia. It became independent in 1991, after nearly 70 years as a republic of the Soviet Union. Uzbekistan is a member of the Commonwealth of Independent States, a loose association of former Soviet republics.

Uzbekistan extends from the foothills of the Tian Shan and Pamir mountains to the land just west of the Aral Sea. The country covers 447,400 square kilometres and has about 23 million people. Tashkent is Uzbekistan's capital and largest city.

Government. Uzbekistan has a president, a prime minister, and a Cabinet of Ministers. The people elect the president, the most powerful government official, to a five-year term. The president appoints the prime minister and Cabinet members, as well as governors of the country's provinces. The prime minister and Cabinet carry out government operations. Members of the country's legislature are elected to five-year terms.

The dominant political party in Uzbekistan is the People's Democratic Party of Uzbekistan. It formed after the Soviet Communist Party disbanded in 1991. This party kept much of the Communist Party's membership and policies.

People. Many different ethnic groups live in Uzbekistan. The largest is the Uzbeks, who make up more than 70 per cent of the population. The Uzbeks are descended from Turkic tribes, Mongols, Persians, and other peoples. They live mainly in rural areas. Uzbek, the official language, is related to Turkish. Russians, the second largest group, make up less than 10 per cent of the population. They speak Russian and live mainly in cities. Other groups include Tatars, Kazakhs, Tajiks, and Karakalpaks. Many non-Russians also speak Russian because the Soviet government encouraged people to learn the language when Uzbekistan was a Soviet republic. Most people in Uzbekistan are Muslims. Islam (the Muslim religion) is an important force in Uzbek society.

About 60 per cent of Uzbekistan's people live in rural areas. Most of them are farmers. In rural areas, most homes are made of sun-dried earthen bricks. Many of these buildings have no indoor plumbing or central heating. City dwellers live in single-storey homes and multistorey apartment buildings.

Throughout Uzbekistan, people wear both traditional and Western-style clothing. Traditional dress for men includes long robes and black boots. Women sometimes wear bright cotton or silk dresses and silk scarves. People often wear traditional embroidered skullcaps, both with traditional and Western-style clothing.

Most families in Uzbekistan are large, and many include six or more children. In rural areas, many members of an extended family may live together in one household. Such a household might include parents, married children and their offspring, and other relatives. Because of marriage patterns, it is common for all the people in a village to be related to one another. Many marriages are arranged by parents. People in Uzbekistan spend much time entertaining guests, and they have elaborate customs related to hospitality.

Foods commonly eaten in Uzbekistan include rice, vegetables, fruit, mutton, and a flat, round bread called *nan. Palav,* also called *pilaf,* is a well-known Uzbek dish of mutton and rice. Tea is the most popular drink.

Soccer is widely enjoyed in Uzbekistan. Traditional Uzbek recreational activities include wrestling and tightrope walking. Another favourite sport is *ulaq,* a game played on horseback in which riders try to grab a dead sheep and carry it across a goal.

Facts in brief about Uzbekistan

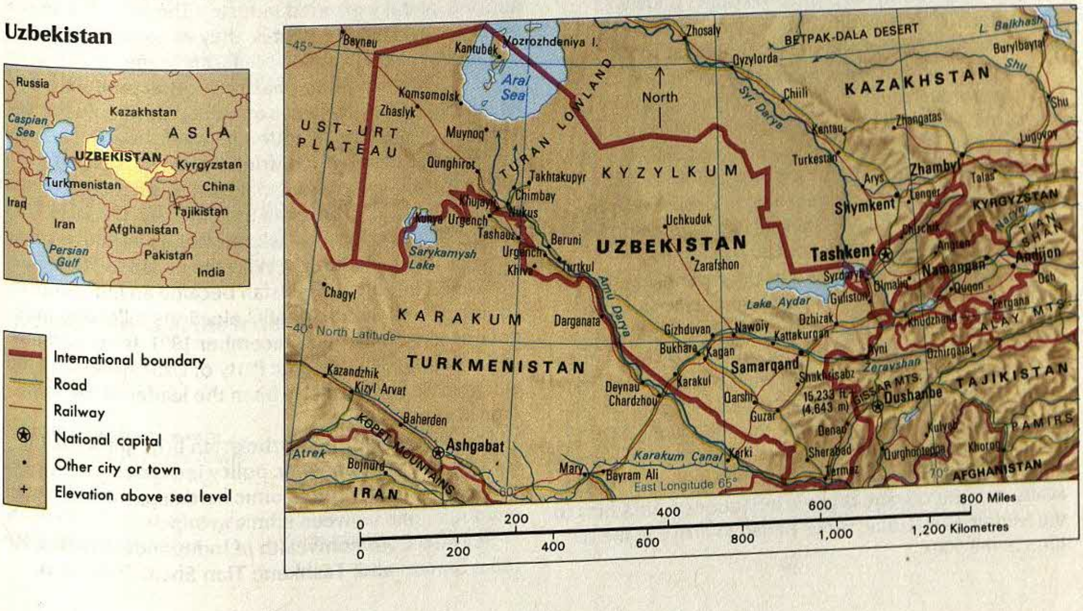
Capital: Tashkent.
Official language: Uzbek.
Official name: Uzbekiston Respublikasi (Republic of Uzbekistan).
Area: 447,400 km^2. *Greatest distances*—north-south, 925 km; east-west, 1,450 km.
Elevation: *Highest*—peak in the Gissar mountain range, 4,643 m. *Lowest*—Sarykamysh Lake (seasonal salt lake bed), 20 m below sea level.
Population: *Estimated 1996 population*—23,308,000; *density,* 52 people per km^2; *distribution,* 59 per cent rural, 41 per cent urban. *1989 census*—19,906,000. *Estimated 2001 population*—25,861,000.
Chief products: *Agriculture*—cotton, eggs, grapes, livestock, milk, potatoes, rice. *Manufacturing*—agricultural machinery, chemicals, food products, paper, textiles. *Mining*—coal, copper, gold, natural gas, petroleum.
Flag: The flag has three broad horizontal bands—light blue, white, and light green (top to bottom)—separated by thin red lines. The blue band shows a white crescent and stars. See **Flag** (picture: Flags of Asia and the Pacific).
Money: *Currency unit*—Uzbekistan sum. One sum = 100 tijins.

Uzbeks are known for their crafts. These include carpet making, embroidery, glazed pottery, jewellery making, metalwork, and woodcarving.

Children in Uzbekistan attend primary and general secondary schools, and many young people continue their education in trade schools, institutes, or universities. The country has numerous universities and other institutes of higher education.

Land and climate. About 80 per cent of Uzbekistan's land consists of plains and deserts. The vast Kyzylkum desert lies in central Uzbekistan. It is largely uninhabited except for mining towns. Plains south and east of the desert are used mostly for growing cotton. Livestock are reared in the plains and in irrigated desert areas. Uzbekistan's most densely populated region is the Fergana

Uzbekistan



Uzbek people make up the largest ethnic group in Uzbekistan, with their own family traditions and customs, *left,* and distinctive national dress and dances, *above.*

Valley, in the east. The valley receives its water from mountains of the Tian Shan range that surround it. Central Asia's two most important rivers, the Syr Darya and the Amu Darya, flow to the Aral Sea from the Tian Shan and Pamir mountains.

Summers in Uzbekistan are long, dry, and hot. Winters are cold. Summer temperatures in southern Uzbekistan may reach 45 °C. In the north, winter temperatures may drop to −37 °C. Over 70 per cent of Uzbekistan's precipitation falls in the winter.

Economy. Most of Uzbekistan's economy is controlled by the government, and most businesses are state owned. But in 1990, the government began to allow some free enterprise. By the mid-1990's, many farms and small businesses had been sold to private owners. Before 1991, most of Uzbekistan's trade was with other Soviet republics. Since then, the country has worked to increase its number of trading partners.

Cotton is Uzbekistan's chief agricultural product. Other important products include grapes, melons, and other fruit; milk; rice; and vegetables. Wool from the *karakul,* a breed of sheep reared in Uzbekistan, is highly prized for coats. The country's mines produce coal, copper, gold, natural gas, and petroleum. Uzbekistan's important manufactured products include agricultural machinery, chemicals, food products, and textiles.

An airport in Tashkent handles international flights. Studios in that city broadcast radio and television programmes in both Uzbek and Russian. The country publishes newspapers and magazines in several languages.

History. People have lived in what is now Uzbekistan for thousands of years. Alexander the Great conquered the region in the 300's B.C. From this time to the 1400's, the area was important because of its location along the Silk Road. The Silk Road was a major trade route for caravans carrying silk and other luxury goods from China to the Middle East. Turkic tribes began to arrive in the region in the 500's.

In the 600's, Arabs invaded what is now Uzbekistan and introduced Islam to the area. Mongols, led by Genghis Khan, conquered the region in the early 1200's. In the late 1300's, the Mongol conqueror Tamerlane founded the capital of his vast Asian empire in Samarkand, now Uzbekistan's second largest city.

A group of Turkic tribes known as the Uzbeks invaded what is now Uzbekistan in the 1500's. Over time, political states called *khanates* were established in the region. In the 1800's, the khanates were conquered by Russia or came under Russian influence. Communists won control of Russia in 1917. In 1924, Uzbekistan became a republic of the Soviet Union.

The Soviets made many changes in Uzbekistan. The Soviet government built roads, schools, and modern housing, and it expanded industry. The Soviets also *collectivized* agriculture—that is, they ended private farming and transferred control of farms to the government. The Soviets strongly emphasized cotton production, which caused serious environmental problems. For example, overplanting of cotton harmed the soil, and overuse of fertilizers polluted drinking water.

The Soviet government maintained strict control of all aspects of life in Uzbekistan until the late 1980's. In 1990, the Uzbek government declared that its laws overruled those of the Soviet Union. With the collapse of the Soviet Union in 1991, Uzbekistan became an independent country. The first presidential elections following independence were held in December 1991. Islam Karimov of the People's Democratic Party of Uzbekistan won the election. He had formerly been the leader of the Communist Party.

The rapid changes in Uzbekistan brought some unrest. Changes in economic policy increased both prices and unemployment. Economic hardship, in turn, worsened relations between ethnic groups.

See also **Commonwealth of Independent States; Pamirs; Samarkand; Tashkent; Tian Shan; Turkestan.**

Vv

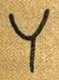
V is the 22nd letter of the English alphabet. It came from a letter used by the Semites, who once lived in Syria and Palestine. They called the letter *waw,* their word for *hook.* They wrote the letter with a symbol borrowed from an Egyptian *hieroglyphic,* or picture symbol. The Greeks borrowed the letter from the Phoenicians and gave it a *Y*-shape. The Romans, when they adopted the letter, dropped the vertical stroke. They used it for the vowel sound, *u*, and the consonant sound, *v*. About A.D. 900, people began to write *v* at the beginning of a word and *u* in the middle.

During the Renaissance, people began using the letter *v* for the consonant and *u* for the vowel. But the change was not final for several hundred years. See **Alphabet.**

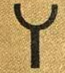
Uses. *V* or *v* is about the 21st most frequently used letter in books, newspapers, and other material printed in English. *V* is the Roman numeral for five. As an abbreviation, *V* may stand for *veteran* or *volunteer.* It is the abbreviation for *verb* in grammars and dictionaries. In music, it stands for *violin* or *voice.* It may mean *various, volt, volume,* or *versus.* In chemistry, *V* is the symbol for the element *vanadium.*

Pronunciation. A person pronounces *v* by placing the lower lip on the upper teeth, closing the *velum,* or soft palate, and forcing the breath through the teeth and lips, vibrating the vocal cords. This sound may be spelled *ph,* as in *Stephen.* In German, it is the usual sound of the letter *w*. The letter *v* in German sounds like the English *f*. In Spanish, the *v* may have a *b* sound.

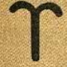
Development of the letter V



The ancient Egyptians drew this symbol of a supporting pole about 3000 B.C. The Semites adapted the symbol and called it *waw,* their word for *hook.*



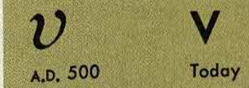
The Phoenicians used this symbol of a hook in their alphabet about 1000 B.C.



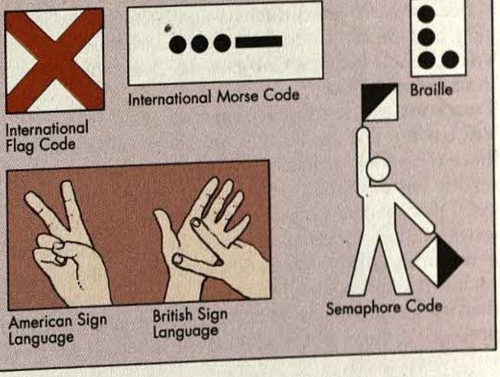
The Greeks changed the symbol about 600 B.C. They called the letter *upsilon.*

The Romans, about A.D. 114, gave the V its capital form.

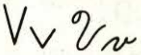
The small letter v developed during the A.D. 500's from Roman writing. It changed slightly in the 800's and, by the 1500's, had the form we use today.



Special ways of expressing the letter V

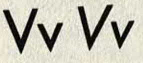


Common forms of the letter V



Handwritten letters vary from person to person. *Manuscript* (printed) letters, *left,* have simple curves and straight lines. Cursive letters, *right,* have flowing lines.

Roman letters have small finishing strokes called *serifs* that extend from the main strokes. The type face shown above is Baskerville. The italic form appears on the right.



Sans-serif letters are also called *gothic letters.* They have no serifs. The type face shown above is called Futura. The italic form of Futura appears on the right.

Computer letters have special shapes. Computers can "read" these letters either optically or by means of the magnetic ink with which the letters may be printed.

V-1, V-2. See **Guided missile** (The first guided missiles); **Rocket** (Rockets of the early 1900's).

V-E Day, which stands for Victory in Europe Day, was officially proclaimed on Tuesday, May 8, 1945 (May 9 in the Soviet Union). It marked the surrender of the German armed forces and the end of the fighting against Germany.

The German surrender was signed at the headquarters of General Dwight D. Eisenhower, supreme commander of Allied forces in Europe, in Reims, France, at 2:41 a.m. on May 7. Colonel General Alfred Jodl, chief of staff of the German armed forces, signed for Germany.

See also **World War II** (Victory in Europe).

V-J Day, which stands for Victory over Japan Day, marked the end of World War II. On August 14, 1945, it was announced that Japan had agreed to surrender. Japan had been trying to end the war, and there had been rumours of the surrender for the four days before August 14.

September 2, 1945, has since been declared the official V-J Day. On that day, the Japanese signed the terms of surrender aboard the battleship U.S.S. *Missouri* in Tokyo Bay.

See also **World War II** (Victory in the Pacific).

Vaal is one of South Africa's major rivers. The river forms the provincial boundary between North West and Free State. It is the main stream flowing into the Orange River. The Vaal rises in Eastern Transvaal near Klipstapel and Breyten. It flows in a southwesterly direction for 1,355 kilometres, joining the Orange River 13 kilometres west of Douglas.

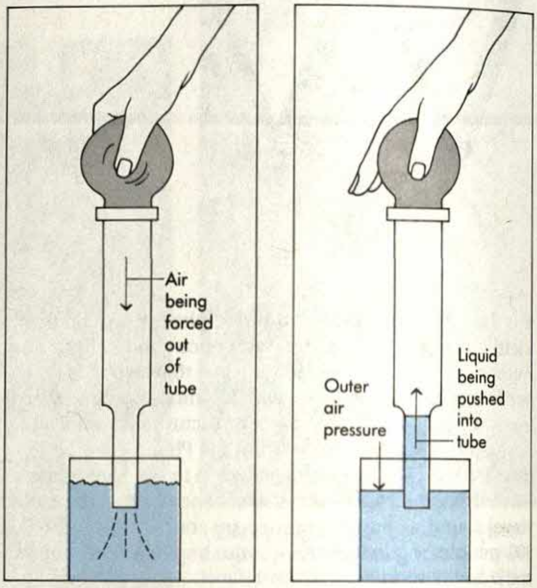
Vaal means *tawny* in Afrikaans. It describes the colour of the water. It is probably derived from the Khoikhoin name for the river, *Heigariep* (tawny or grey river). Sotho and Tswana people called it the *Tshetlha* (yellow river). The Vaal Barrage was built in 1923 to provide water to the Witwatersrand area. The Vaal Dam was built in 1936 to increase this water supply. The Bloemhof and Grootdraai dams supply much-needed water to farmers. Major industrial areas, such as Vanderbijlpark, Vereeniging, and the Witwatersrand, depend on the Vaal.

Vaca, Álvar Núñez Cabeza de. See **Cabeza de Vaca, Álvar Núñez.**

Vaccination. See **Immune system.**

Vacuum is a space that has no matter in it. However, there is no such thing as a complete vacuum because no one has ever been able to remove all the air molecules in a space. A vacuum may also be described in terms of the pressure of the air or another gas that remains in a partially evacuated container. In this sense, a vacuum is any enclosed space in which pressure is less than *normal atmospheric pressure.* Normal atmospheric pressure is the pressure of the atmosphere at sea level—101.3 kilopascals.

Scientists speak of *high* or *low* vacuums, depending on how much gas has been removed from a container. The fewer the number of gas molecules in a container, the less the pressure is. The highest vacuum measured so far, approximately 0.0000000001 pascal, is only about one-quadrillionth of normal atmospheric pressure. Even at this extremely low pressure, 1 cubic centimetre of gas contains about 34,000 molecules. In contrast, 1 centimetre of air at normal atmospheric pressure contains about 26 billion billion gas molecules.



How a vacuum works is shown in these illustrations. When the bulb is squeezed, *left,* air is forced from the tube. When the bulb is released, *right,* the greater air pressure outside pushes liquid into the tube to fill the vacuum.

Various kinds of pumps are used to produce different degrees of vacuums. For example, a *diffusion pump* is used to attain high vacuums. This device sprays streams of vapour that sweep gas molecules out of the enclosed space. Lower vacuums can be produced by means of mechanical pumps equipped with rotors and valves.

Vacuums have many practical uses. Gases and liquids tend to flow from areas of high pressure to those of lower pressure—that is, into a vacuum. Drinking liquid through a straw involves this principle. Sucking on the straw produces a partial vacuum inside the mouth and in the top part of the straw. The greater pressure of the air outside pushes the liquid up the straw. A vacuum cleaner operates on the same principle. A fan produces a vacuum inside the machine. Air rushes in to fill the vacuum, carrying with it dust and dirt.

A vacuum conducts heat poorly, and so it is an effective insulator. A thermos flask used to keep liquids hot or cold consists of a double-walled container with a vacuum in the space between the walls. A similar type of vacuum flask called a *Dewar flask* is used in laboratories to store extremely cold liquefied gases.

In a vacuum, water and many other liquids evaporate rapidly at a temperature much lower than their normal boiling point. For this reason, vacuum chambers are used in drying operations where it is essential to remove moisture from a substance quickly without burning it. Such operations include sugar refining and the freeze-drying of food.

Many kinds of electronic devices require a vacuum. The picture tube of a television set and the visual display of a computer system are familiar examples of devices containing a vacuum. The vacuum in such a device, also called an *electron tube,* allows beams of electrons to travel directly to the screen, where they form a picture. If too many air molecules were present in the tube, the electrons would collide with the molecules and scatter, destroying the picture.

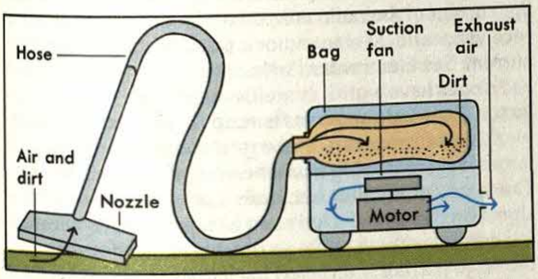
Other kinds of devices, such as those employed in industry and scientific research, use vacuum chambers for a similar reason. For example, cyclotrons, synchrotrons, and other particle accelerators used to increase the energy level of atomic particles require extremely high vacuums.

See also **Thermos flask; Vacuum cleaner; Valve.**

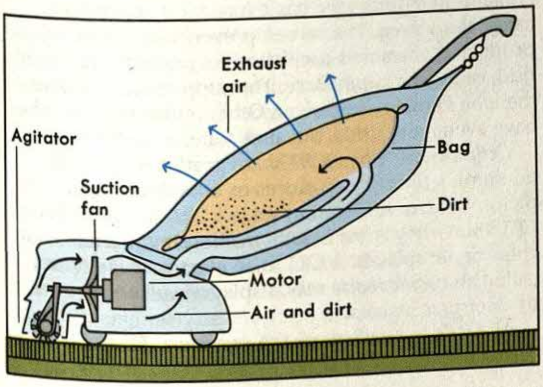
Vacuum cleaner is an electric appliance that cleans chiefly by suction. Vacuum cleaners remove dirt and waste material from carpets, rugs, and bare floors. They also may be used to remove dust from clothing, curtains, furniture, machinery, woodwork, and other items.

A vacuum cleaner works by means of a suction fan, which creates a partial vacuum within the machine. Outside air, which always tries to fill a vacuum, flows rapidly into the cleaner, sweeping up loose dirt. A bag, or other container, traps the dirt, and the cleaned air is blown out of the machine. The container must be emptied or changed regularly. In some models, dirt is deposited in a tank of water, which filters out dust.

There are two main kinds of vacuum cleaners, *canisters,* or *tanks,* and *uprights.* A canister vacuum cleaner contains a bag and a powerful suction fan. Dirt is pulled into the bag through a flexible hose to which a variety of nozzles can be attached. An upright vacuum cleaner has a small fan and an *agitator* in its base. The agitator is a rotating cylinder with bristles that loosen dirt. Waste is sucked into a bag attached to the handle of the machine. Some cleaners combine various features of canisters and uprights. Such *combination vacuum cleaners* have both an agitator in their nozzle and a canister unit to provide powerful suction.



The two main kinds of vacuum cleaners are the *canister,* or *tank,* and the *upright.* In a canister, *above,* a suction fan pulls dirt through a flexible hose and into a bag. In an upright, *below,* a suction fan draws in waste material that has been loosened by an *agitator,* a rotating cylinder with bristles.



Other types of vacuum cleaners include *hand* models, *lightweight* models, and *wet-and-dry* models. A hand vacuum cleaner can be carried easily in one hand. It is convenient for cleaning surfaces that cannot be reached with a conventional machine. A lightweight vacuum cleaner is used for light cleaning and dusting. It looks like an upright but weighs less, produces little suction, and has no agitator. A wet-and-dry vacuum cleaner cleans up liquids as well as dust.

The first motor-driven vacuum cleaning devices were developed about 1900. Several inventors produced various types of vacuum cleaners in the early 1900's.

Vacuum flask. See **Thermos flask.**

Vacuum gauge. See **Gauge.**

Vacuum pump. See **Pump.**

Vacuum tube is a device used in such electronic equipment as radios, television sets, and computers. Vacuum tubes control the electric currents, called *electronic signals,* that are necessary to the operation of such equipment. The tubes help to create these signals, strengthen them, combine them, or separate them from one another.

The outer part of a vacuum tube consists of a tubelike glass or metal shell. Inside the shell are specially designed wires and small metal plates that control the electronic signals. The vacuum tube gets its name from the fact that almost all the air must be removed from the tube for it to work. A *partial vacuum* is created inside the tube by pumping out as much air as possible.

Vacuum tubes were essential to the development of the science and technology of electronics. From the 1920's to the 1950's, all electronic equipment used vacuum tubes called *valves.* Since that time, the valve has been replaced in most kinds of electronic equipment by a newer device called the *transistor.* Transistors do the same jobs as valves. But they are smaller and more reliable and consume less power (see **Transistor**). Certain electronic equipment still uses various types of vacuum tubes. For example, the screen of a television set is one end of a large vacuum tube called a *cathode-ray tube.* See **Electronics** (Devices and circuits).

How a vacuum tube works. The outer part of most common vacuum tubes is a glass or metal container called an *envelope* or *bulb.* The envelope encloses two or more metal parts called *electrodes.* The electrodes create and control a flow of electrons within the tube. This flow corresponds to the electronic signal being controlled by the tube. The electrodes usually are connected to electric circuits outside the tube by wires that pass through the base of the envelope.

Two basic electrodes in a vacuum tube are the *emitter,* or *cathode,* and the *collector,* or *anode.* The emitter gives off electrons. These electrons flow to the collector, which in most tubes surrounds the emitter. A coating on the emitter gives off electrons when heated. Close to the emitter is a *filament* (fine wire) much like that of a light bulb. Electric current from outside the tube flows through the filament and heats it. The filament heats the emitter, causing it to give off electrons.

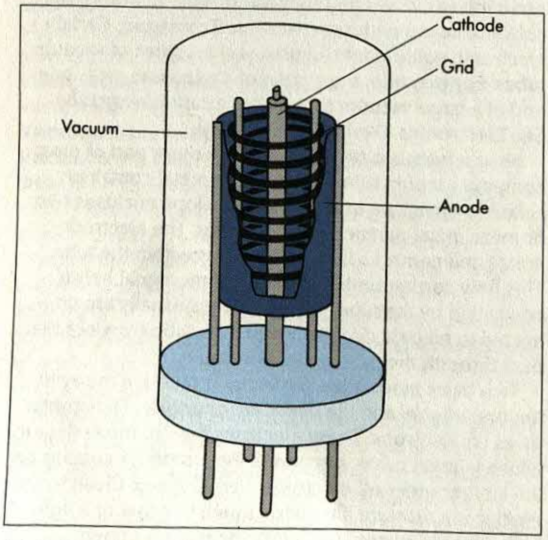
The emitter usually has a negative electric charge and the collector usually has a positive charge. The electrodes get their charges from a battery or other source of direct current. The emitter's negative charge helps to push away the electrons it produces. This happens because electrons have a negative charge, and two negative charges—or two positive charges—always push away from each other. But a negative and a positive charge always attract each other. Thus, the positive collector attracts the negative electrons. In this way, a current of electrons flows from the emitter to the collector.

Another basic vacuum tube electrode is the *grid.* It consists of a wire mesh located between the emitter and the collector. The grid controls the amount of electrons flowing through the tube. A strong negative charge on the grid prevents many of the electrons from reaching the collector. If the negative charge becomes weaker, more electrons get past the grid and reach the collector. The strength of the charge on the grid corresponds to the strength of the electronic signal entering the tube.

A vacuum tube may have several other parts between the emitter and collector. It may also have charged metal plates that can "bend" a stream of electrons created in the tube. Magnets outside the tube can also bend the stream of electrons.

Kinds of vacuum tubes. There are many hundreds of vacuum tubes having various sizes and functions. But electrical engineers classify all tubes into a few basic types. Valves, the kind once widely used in radio and television receiving sets, are classified by the number of electrodes they have. Valves include (1) *diodes* (two-electrode tubes), (2) *triodes* (three-electrode tubes), and (3) multielectrode tubes. Other types of tubes include (1) cathode-ray tubes, (2) microwave tubes, and (3) gas-filled tubes.

Diodes have only an emitter and a collector. These tubes are used chiefly as *rectifiers.* A rectifier changes alternating current into direct current. An alternating current is one that keeps reversing its direction of flow. An electrode connected to a source of alternating current gets a charge that constantly changes from positive to negative and back again. If an alternating current is sent to a diode, the tube will pass the current only when the emitter has a negative charge. This happens only when the current is flowing in one direction. Thus, the current leaving the tube is direct current.



A triode vacuum tube creates and controls a flow of electrons in a vacuum. Electrons leave the cathode when a source of direct current is connected to the tube. The electrons flow through the grid to the anode. The voltage applied to the grid controls the number of electrons that reach the anode.

The audion was the first vacuum tube that could strengthen an electronic signal. It led to the development of electronics.

Diodes were used in receiving sets as rectifiers and also as *detectors.* A detector changes the weak alternating current of the radio waves into direct current. The receiver produces a sound or a picture from this direct current. See **Electronics** (Switching).

Triodes have a grid, as well as an emitter and a collector. The triode *amplifies* (strengthens) weak signals. A weak signal connected to the grid controls the much larger current flowing from the emitter to the collector. The large current thus becomes a stronger copy of the signal on the grid. A triode can also produce an alternating current without using an outside signal if some of the large current is directed back to the grid. When the triode operates in this way, it is called an *oscillator.* See **Electronics** (Amplification; Oscillation).

Multielectrode tubes have more than one grid between the emitter and collector. Two important multielectrode tubes are the *tetrode* and *pentode.* A tetrode contains two grids—the basic one and a second grid called the *screen.* The screen prevents the tube from producing unwanted oscillations. A pentode has a third grid, called the *suppressor.* The suppressor improves the tube's amplifying power. Other multielectrode tubes have even more grids, but such tubes have limited use.

Cathode-ray tubes (CRT's) are used in electronic equipment to display pictures or other information. The picture tube of a television set is a CRT. In a radar set, a CRT shows tiny spots of light that locate the position of ships or aeroplanes. A CRT in an electronic instrument called an *oscilloscope* may display wavy-line "pictures" of electronic signals.

All CRT's basically work the same way. The tube has a round or rectangular screen at one end. The tube tapers from the screen to a narrow neck at the opposite end. In the neck, the emitter and other electrodes are arranged to form an *electron gun*. The electron gun "shoots" a beam of electrons toward the screen. Wherever the beam strikes the screen, it causes a special coating to glow. Electrically charged metal plates inside the CRT, or electromagnets outside the CRT, move the beam across the screen. The beam thus "paints" a picture on the screen with spots of light. See **Television** (The picture tube).

Microwave tubes produce or control radio waves of extremely high frequencies. Radar sets, long distance telephone and television systems, and microwave ovens use such waves. Three types of microwave tubes are *klystrons, magnetrons,* and the *travelling-wave* tube.

Gas-filled tubes contain a small amount of such gases as argon, mercury vapour, and neon. These gases increase the amount of current that can flow through a tube. The atoms of gas become *ionized* by losing some of their electrons and thus becoming positively charged. The ionized atoms can carry much more electrical current than would otherwise flow through the tube. A typical gas-filled tube is the *thyratron.*

Development of the vacuum tube. Electrical experimenters began working with devices that resembled vacuum tubes during the mid-1800's. These devices were glass tubes with the air partially removed. The experimenters noticed a glow around the tubes, as well as other unusual effects, when electricity flowed through the tubes. See **Electronics** (Early experiments).

The American inventor Thomas A. Edison invented the first electronic vacuum tube. But he did not realize the importance of his invention. In the early 1880's, Edison sealed an extra electrode into an electric light. When the light was on, Edison found that a current flowed from the filament to the extra electrode if this electrode was positively charged. This phenomenon became known as the *Edison effect.* Edison made no use of his discovery, which was actually a diode vacuum tube.

A British scientist, John Ambrose Fleming, experimented with the Edison effect. His experiments led him to develop a diode in 1904 to detect "wireless" radio signals. Fleming's *valve,* as he called his device, was the first practical radio tube.

In 1906, the American inventor Lee De Forest patented a two-electrode tube much like the Fleming valve. De Forest called his tube an *audion.* In 1907, De Forest patented an audion with a zigzag wire between the other two electrodes. This tube was the first triode.

In 1912, Harold D. Arnold, an American physicist, began experimenting with the audion. He changed its internal construction and removed as much air as possible to create a partial vacuum in the tube. In 1914, De Forest's audion worked successfully as an amplifier on a long-distance telephone line.

Beginning in 1912, several inventors contributed to the development of the audion as an oscillator. They included De Forest and the American radio pioneer Edwin H. Armstrong. During World War I (1914-1918), Walter Schottky, a German physicist, invented an experimental four-element tube. From this tube, Albert W. Hull, an American engineer, developed a practical tetrode tube in 1924. A Dutch engineer, Benjamin D. H. Tellegen, invented the pentode in 1926.

The work of two inventors during the 1920's led to the development of electronic television. The Russian-born American scientist Vladimir Zworykin invented a TV camera tube called the *iconoscope,* an electronic tube that converts light rays into electric signals. Philo T. Farnsworth, an American inventor, also developed a TV camera tube called the *image dissector.*

Attention turned away from valves after the development of the transistor in the 1950's and the integrated circuit in the 1960's. These *solid-state devices,* in which electronic signals flow through a solid material instead of through a vacuum, have largely replaced valves.

See also **Electronics** and its list of *Related articles.*

Vaduz (pop. 4,920) is the capital of the principality of Liechtenstein. The city lies in an Alpine valley (see **Liechtenstein** [map]). The major industry is cotton manufacturing. Vaduz was founded in the Middle Ages, and many of the original buildings are still standing. The castle of the princes of Liechtenstein stands on a mountain high above the city.

Vagina is a female reproductive organ. It consists of a tube-shaped canal that lies behind the bladder and the *urethra* (urinary canal) and in front of the rectum. The vagina extends from the *cervix* (lower end of the uterus) to an opening out of the body between the legs. During sexual intercourse, the penis of the male is inserted into the vagina of the female. The vagina serves as the *birth canal,* the passage through which a baby is born. Blood and cells from the uterus are shed by way of the vagina during menstruation (see **Menstruation**).

The vagina measures about 10 centimetres in length. It has muscular walls lined with a mucous membrane. This lining has numerous folds or ridges running across it. Normally, the walls of the vagina are collapsed so that they touch each other. This gives the vagina a slitlike appearance. In females who have not had sexual intercourse, the vaginal opening may be partially covered by a thin membrane called the *hymen.*

The mucous membrane that lines the vagina contains many nerve endings. The areas near the vaginal opening and around the *clitoris,* a small knob of tissue in front of the urethra, are very sensitive to touch. Secretions from glands in the cervix moisten and lubricate the vagina's internal surface. During childbirth, the muscular walls of the vagina stretch enormously to allow the baby to pass out of the mother's body.

See also **Reproduction** (Human reproduction); **Vaginitis.**

Vaginitis is an inflammation of the vagina. It is characterized by itching and swelling, plus an abnormal vaginal discharge. The inflammation may also affect the *vulva,* the folds of skin outside the vagina. Vaginitis occurs most frequently during the childbearing years of women.

Most cases of vaginitis result from infection by certain bacteria, fungi, and protozoans. The infectious organisms produce great amounts of waste material that irritates the vagina and vulva, causing swelling and itching. One of the most common of the various bacteria that cause vaginitis is *Haemophilus vaginalis.* These bacteria cause the whitish, filmy fluid normally present in the vagina to thicken and turn grey or yellow. A fungus called *Candida,* also known as *Monilia,* turns the vaginal fluid thick and white. A protozoan called *Trichomonas* causes the fluid to turn yellow-green or grey and become thin and foamy.

The infectious bacteria, fungi, and protozoans may be present in the vagina without causing vaginitis. They are normally kept in balance so that none exists in harmful quantities. Vaginitis occurs when the balance is upset, allowing one or more of the organisms to reproduce in great numbers. The balance can be disturbed by many factors, including pregnancy, poor health or diet, lack of sleep, or the use of certain drugs. Cuts, scrapes, or irritation from laundry detergents or perfumed soaps or talcum powders can increase the likelihood of vaginal infection.

Vaginitis is treated following tests on the vaginal fluid to determine which organism is causing the infection. Certain antibiotics and other medicines are used to cure vaginitis.

Vagrancy. A person who wanders from place to place, and who lives without working and without any settled home, is called a *vagrant,* or *vagabond.* Many countries have laws against vagrancy, based on the idea that a vagrant has "no visible means of support" and may become a public liability. A person arrested for vagrancy may be sentenced to a fine or a term in jail. Law enforcement officers often arrest beggars and criminals as vagrants. Some vagrancy laws have been criticized because they do not specify the kinds of activities that make up vagrancy.

Valadian, Margaret (1936-   ), an Aboriginal social worker, became Australia's first Aboriginal woman university graduate in 1966. Valadian was born in Brisbane, Queensland. She studied social work at Queensland University from 1962 to 1966 and studied for postgraduate degrees in the United States, at the University of Hawaii and New York State University.

Valadian chaired the Aboriginal educational consultative group for the Commonwealth Schools Commission from 1974 to 1976, and set up the National Aboriginal Education Committee. In 1978, she helped to found the Aboriginal Training and Cultural Institute in Sydney. She became vice president of the New South Wales Board of Adult Education in 1982.

Vale of Glamorgan (pop. 110,700) is a local government district and borough in South Glamorgan, Wales. It includes Cardiff Airport and a large Royal Air Force base. A stretch of fine coastline along the southern boundary of the district includes the popular resorts of Barry Island and Penarth. Barry is an important industrial port with large deep-water docks. Penarth, home for many people who work in nearby Cardiff, has fine parkland. The inland region has lovely scenery. Cowbridge is a market town in the heart of the Vale.

See also **Glamorgan.**

Vale of White Horse (pop. 109,200) is a local government district in southwestern Oxfordshire, England. The River Ock runs through the vale, and chalk uplands rise to the south. Agriculture is important, with grain crops and sheep being the chief products. Other industries include brewing, and making surgical instruments. Several research establishments are in the district, including the nuclear research establishment at Harwell. The district takes its name from the Uffington White Horse, a huge horse figure cut in a chalk hill at Uffington.

See also **Oxfordshire; White horses.**

Vale Royal (pop. 111,100) is a local government district in central Cheshire, England. Fruit and potato growing and dairy farming are important in the area. Its industries include chemical factories at Northwich and nearby Lostock Gralam. Vale Royal occupies part of the Cheshire saltfield, and rock salt is still mined at Winsford. An impressive sandstone ridge lies in the west. At Delamere, there is a 1,600-hectare forest. Oulton Park, near Tarporley, is famous for motor racing.

See also **Cheshire.**

Valence. See **Valency.**

Valencia (pop. 752,909) is the third largest city in Spain. Only Madrid and Barcelona are larger than Valencia. Valencia lies on the Turia River, 5 kilometres from the Mediterranean coast and its port of Villanueva del Grao (see **Spain** [political map]). Hundreds of years ago, the Romans built walls around their settlement at Valencia. These walls were torn down in 1871. A gate called Torres de Serranos was built in 1238. Two towers were added in the late 1300's, and restored in 1930.

The city is one of the railway centres of eastern Spain, and carries on a large export trade in oranges and other fruit. Valencia is noted for its silk, coloured tiles, tobacco, textiles, and iron and bronze wares. Other products that are manufactured in the city include cement, furniture, musical instruments, paper, toys, and perfumes and cosmetics.

Valencia was long occupied by the Moors. It has rows of white houses built in the Moorish style, and many famous public buildings dating from the 1200's, although today much of the city is modern. The University of Valencia is well known.

Valency, also called *valence,* is a number that indicates the ability of a chemical element to combine with other elements. In the past, valency had several slightly different meanings. The term is gradually being replaced by more precise chemical descriptions.

Valency was first defined as the number of hydrogen atoms that can combine with each atom of an element. For example, each atom of oxygen can combine with two hydrogen atoms to form water (H_2O). Therefore, oxygen has a valency of two. A second definition of valency is based on the charges of ionized atoms. Sodium ions generally have one positive charge, so the valency of sodium is one.

A third definition of valency is based on the number of *bonds* (chemical links) that an atom forms with other atoms. Because carbon atoms usually form four bonds, carbon is said to have a valency of four. Many elements can combine in so many ways that they have several valencies. For example, sulphur has common valencies of 2, 4, and 6.

See also **Bond** (Chemical).

Valens (A.D. 328-378) was the Roman emperor who allowed large numbers of barbarians to settle south of the Danube River. In A.D. 376, the Visigoths, threatened by other barbarians, sought refuge along the Roman Empire's northern boundaries. Valens let them settle there, hoping to integrate them into his army. But Roman officials mistreated the Visigoths, and they revolted. In 378, they killed Valens and destroyed his army at Adrianople (now Edirne, Turkey). The Visigoths soon became the first independent barbarian nation in the Roman Empire (see **Goths**).

Valens was born at Cibalae, near what is now Belgrade, Serbia. His brother, Emperor Valentinian I, named him co-emperor to administer the eastern provinces in 364. Valens supported the *Homoean* creed, which stated that Jesus Christ was merely like God the Father, and not of the same essence as the Father. Valens persecuted many orthodox Christians.

Valentine, Saint, is the name associated with two martyrs of the early Christian church. Little is known about them. The Roman history of martyrs lists two Saint Valentines as having been martyred on February 14 by being beheaded. One supposedly died in Rome and the other at Interamna, now Terni, 95 kilometres from Rome. Scholars have had great difficulty in finding historical fact among the Saint Valentine legends.

The Saint Valentine who died in Rome seems to have been a priest who suffered death during the persecution of Claudius the Goth about A.D. 269. A basilica was built in his honour in Rome in A.D. 350, and a catacomb containing his remains was found on this location.

Another history of martyrs mentions a Saint Valentine who was bishop of Interamna and who may have been martyred in Rome. By being remembered both in Rome and in Interamna, he may have come to be considered as two people, but this is not entirely certain.

The custom of exchanging valentines on February 14 can be traced to the English poet, Geoffrey Chaucer. He mentioned that birds began to pair off on that day (see **Valentine's Day**).

Valentine's Day is celebrated in many countries on February 14 as a festival of romance and affection. People send greeting cards called *valentines* to their sweethearts, friends, and members of their families. Many valentine cards have romantic verses, and others contain humorous pictures and sayings. Many say, "Be my valentine." Valentine's Day parties and dances are often held. Many people send flowers, chocolates, or some other gift to their wives, husbands, or sweethearts.

The earliest records of Valentine's Day in English tell that birds chose their mates on that day. People used a different calendar before 1582, and February 14 came on what is now February 24. Geoffrey Chaucer, an English poet of the 1300's, wrote in *The Parliament of Fowls,* "For this was on St. Valentine's Day, / When every fowl cometh there to choose his mate." William Shakespeare also mentioned this belief in *A Midsummer Night's Dream.* A character in the play discovers two lovers in the woods and asks, "St. Valentine is past; / Begin these woodbirds but to couple now?"

Early Valentine customs. People in England probably celebrated Valentine's Day as early as the 1400's. Some historians trace the custom of sending verses on Valentine's Day to a Frenchman named Charles, Duke of Orléans. Charles was captured by the English during the Battle of Agincourt in 1415. He was taken to England and put in prison. On Valentine's Day, he sent his wife a rhymed love letter from his cell in the Tower of London.

Many Valentine's Day customs involved ways that single women could learn who their future husbands would be. Englishwomen of the 1700's wrote men's names on scraps of paper, rolled each in a little piece of clay, and dropped them all into water. The first paper that rose to the surface supposedly had the name of a woman's true love.

Valentines by Kate Greenaway, a British artist, showed garden scenes. This card was printed in the 1880's by Marcus Ward & Company, a London greetings card company.

One description of Valentine's Day during the 1700's tells how groups of friends met to draw names. For several days, each man wore his valentine's name on his sleeve. The saying *wearing his heart on his sleeve* probably came from this practice.

The custom of sending romantic messages gradually replaced that of giving gifts. In the 1700's and 1800's, many shops sold handbooks called *valentine writers.* These books included verses to copy and various suggestions about writing valentines.

Commercial valentines were first made in the early 1800's. Many of them were blank inside, with space for the sender to write a message. The British artist Kate Greenaway became famous for her valentines in the late 1800's. Many of her cards featured happy children.

See also **Lupercalia; Valentine, Saint.**

Valentinian I (A.D. 321-375) was Roman emperor from A.D. 364 until his death in 375. He ruled capably and with absolute power. Valentinian tried to protect the poor from dishonest government officials and powerful senators. He also allowed much religious freedom.

Valentinian was born at Cibalae, near what is now Belgrade, in Serbia. He served as an officer in the Roman army. In A.D. 364, he was chosen emperor after the death of Emperor Jovian. Valentinian appointed his brother Valens co-ruler and gave him the eastern provinces to rule. Throughout Valentinian's reign, the group of German tribes in the north known as the Alamanni and the desert tribes in Africa rebelled. Valentinian spent much of his time as emperor campaigning against the Alamanni.

Valentinian III (A.D. 419-455) was emperor of the West Roman Empire. He was a weak ruler, and the empire lost much territory during his reign.

Valentinian was the son of Emperor Constantius III and grandson of Theodosius I. He became emperor in 425, when he was 6 years old. Political power rested with his mother—Galla Placidia—and various military leaders, especially Flavius Aëtius. Aëtius campaigned in Gaul (now France) and in 451 won an important victory over the invading Huns, who were led by Attila. But a Germanic tribe called the Vandals conquered northern Africa during Valentinian's reign, and Roman Britain was lost to native rulers and barbarian invaders. In addition, the Visigoths and the Suevi, Germanic tribes that had settled in Gaul and Spain, continually extended their territory. The empire's loss of provinces and the revenues they had generated produced acute political tensions. In 454, Valentinian had Aëtius murdered, and a year later was assassinated by Aëtius' followers.

Valentino, Rudolph (1895-1926), was the most popular romantic star of American silent films. He gained fame for his roles as a handsome, passionate lover.

Rudolph Valentino

Rudolph Valentino's real name was Rodolfo d'Antonguolla. He was born in Castellaneta, near Taranto, Italy. He went to New York City in 1913 and worked briefly as a gardener and labourer. Valentino then toured the United States as a dancer in stage musicals. He probably began his film career in *Alimony* (1918). He became a star in *The Four Horsemen of the Apocalypse* (1921). Valentino played a desert warrior in *The Sheik* (1921) and *Son of the Sheik* (1926) and portrayed a bullfighter in *Blood and Sand* (1922). His other films included *Camille* (1921), *Monsieur Beaucaire* (1924), *Cobra* (1925), and *The Eagle* (1925). He died at the age of 31 following surgery for peritonitis.

Valera, Eamon de. See **De Valera, Eamon.**

Valerian family includes more than 300 different kinds of perennial or annual herbs and some shrubs. These grow mostly in the Northern Hemisphere. Several members of this family are grown as garden or border flowers. Another two members are grown as herbs for flavouring food.

One group of valerians has strong-smelling underground parts. Its flowers are small and coloured white or reddish. A well-known species is the *common valerian,* which bears tight clusters of very pale pink flowers. It yields an oil used in medicine.

The two species grown as herbs are called *corn salad,* or *lamb's-lettuce,* and *Italian corn salad.* Both grow about 30 centimetres high. They are native to southern Europe, but corn salad has been introduced in Central Europe and North America. Italian corn salad has pink flowers. Corn salad has blue flowers. Both are grown in spring and autumn.

Scientific classification. Valerians belong to the valerian family, Valerianaceae. Common valerian is *Valeriana officinalis;* corn salad is *Valerianella olitoria;* and Italian corn salad is *Valerianella eriocarpa.*

Valéry, Paul (1871-1945), was a French poet. He wrote two famous long poems, *The Young Fate* (1917) and *The Graveyard by the Sea* (1920), and a collection of shorter poems, *Charmes* (1922). Valéry completed few poems because he believed that poets should work carefully and deliberately rather than be guided by inspiration. He thought that a bad poem resulting from long, careful calculation was better than a masterpiece resulting from chance. Valéry's model of the perfect artist was Leonardo da Vinci. In the essay *Introduction to the Method of Leonardo da Vinci* (1895), he maintained that structure is the basic quality of artistic creation and compared the work of the poet to that of the engineer.

Most of Valéry's nonfiction reflects the attitude of the late 1800's that only through a thorough knowledge of oneself can a person understand the universal psyche. In his book *Regarding the Real World* (1931), Valéry viewed modern man as a Hamlet wavering between self-destruction and self-preservation.

See also **French literature** (The four masters).

Valhalla was the great hall of the dead heroes in Scandinavian mythology. The word means *Hall of the Slain.* It was the most magnificent palace in Asgard, and Odin feasted there with his heroes.

Valhalla had walls of gold and a roof of battle shields. Huge spears held up its ceiling. They were so highly polished that the gleam from them was the only light needed. The 540 doors were so wide that 800 men could enter side by side. The guests sat at long tables. They were the dead heroes who had been brought to Valhalla by the Valkyries, or battle maidens. The Valkyries waited on the tables and served luxurious food.

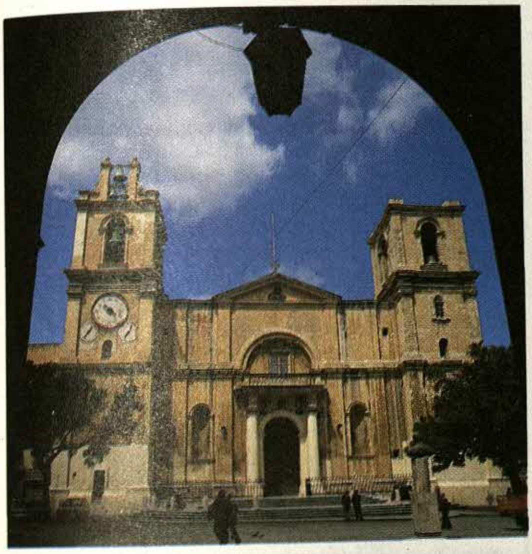
The heroes rode out to the battlefield to fight every morning. They often wounded each other terribly, but their hurts were healed before they returned to Valhalla for the noonday feast.

See also **Odin; Valkyrie.**

Valkyrie was one of the warlike goddess-maidens of Scandinavian mythology. The Valkyries rode on swift horses and were armed with spears, shields, and helmets. Odin sent them to battlefields to choose dead heroes, take them to the great hall of Valhalla, and serve them feasts. The name means *those who choose the fallen.* Brunhild, the maiden whom Sigurd awakened from a magic sleep, was a Valkyrie. Richard Wagner built his opera *Die Walküre* around this theme. See also **Brunhild.**

Valle, José Cecilio Del (1780-1834), a Central American patriot and statesman, wrote the Central American Declaration of Independence, proclaiming freedom from Spain on Sept. 15, 1821. He became a leader of Guatemala's independence movement in 1821. Mexico annexed Guatemala in 1822, and imprisoned Valle briefly. He was elected vice president of the Central American Confederation in 1823, but refused to serve. Valle was born in Honduras.

Valletta (pop. 14,249) is the capital and chief seaport of Malta. It lies on a narrow peninsula between the harbours on Malta's northeast coast. Valletta is the administrative, cultural, and commercial centre of Malta. It is the home of the Royal Malta Library. The Royal University of Malta is at Msida. The Cathedral of Saint John and the Palace of the Grand Masters (now the governor general's residence) are among the city's sights.



Valletta is the picturesque capital of Malta. The city's attractions include the Cathedral of Saint John, built in 1578.

Valletta became the capital of Malta in 1571. It had been founded about five years earlier. Valletta was named after Jean Parisot de la Vallette, grand master of the Knights of Malta. The British maintained a naval base at Valletta from the early 1800's until 1979.

See also **Malta** (map; picture).

Valley is a natural trough in the earth's surface. Systems of valleys extend through plains, hills, and mountains. Rivers and streams flowing through valleys drain interior land regions to the ocean. The bottoms of many valleys have fertile soil, which makes excellent farmland.

All valleys are similar in shape. The bottom of a valley is called its *floor.* Most floors slope in a downstream direction. Mountain valleys usually have narrow floors. But in low-lying plains, a valley floor may be several kilometres wide. The part of the valley floor along river banks is called the *flood plain.* When the river overflows its banks, it floods the flood plain. In some cases, flooding is helpful because it adds *nutrients* (nourishing substances) to the soil. But severe flooding can damage crops and buildings and even kill people.

A valley's sides are called *valley walls* or *valley slopes.* The ridge formed where the walls of neighbouring valleys meet is a *divide.*

Kinds of valleys. Various kinds of valleys are named according to their appearance. A deep valley with steep walls is called a *canyon.* One of the most famous canyons is Grand Canyon in Arizona, U.S.A. Along coastlines, valleys that are flooded by the ocean are called *drowned valleys.* Where a valley joins a larger valley from the side, the two floors usually meet at the same level. But sometimes the floor of the side valley is higher than the floor of the main valley where they join. The side valley is then called a *hanging* valley. A river flowing through a hanging valley may form a waterfall where the water enters the main valley.

Not all valleys are on land. Many deep *submarine* canyons are found on the slopes leading up from the ocean floor to the edge of the continental shelf.

How valleys are formed. Most valleys on dry land are formed by the running water of streams and rivers, and by the erosion of slopes leading to them. Erosion moves material down the slopes to the valley floor where the stream carries it to a lake or to the ocean. In addition, the stream may erode its channel deeper.

A valley may also be formed when a long, narrow section of the earth's crust sinks below the surrounding area. A valley formed in this way is called a *rift valley.* One system of rift valleys extends about 6,400 kilometres from the Sea of Galilee south through the Red Sea, and into southeastern Africa.

Glaciated valleys are valleys enlarged by the action of glaciers. These valleys are often found high in mountains. They are U-shaped rather than V-shaped.

Related articles in ***World Book*** include:

Canyon
Death Valley
Erosion
Great Rift Valley
Hanging valley
Ice Age (Effects of the ice sheets)
Ocean (illustration: The land beneath the oceans)
Valley of the Kings

Valley of the Kings is a rocky, narrow gorge, which was used as a cemetery by the *pharaohs* (kings) of ancient Egypt between 1550 and 1100 B.C. The Valley, sometimes called the Valley of the Tombs of the Kings, lies on the west bank of the Nile River across from Luxor. Sixty-two tombs have been discovered in the Valley of the Kings and in the adjoining Western Valley.

The tombs are in the form of corridors and chambers cut into rock. Carved and painted religious scenes and hieroglyphic texts cover the walls. The art work deals mainly with the activities of a dead king in the hereafter. The tomb of Seti I, discovered in 1817, is the largest and most ornate tomb. Other tombs in the Valley include those of Tutankhamen, Thutmose III, and Ramses II.

Valmy, Battle of. See **Army** (table: Famous land battles).

Valois was the family name of a branch of the great Capetian line of French kings (see **Capetian dynasty**). The House of Valois ruled France from 1328 to 1589. Philip VI, the first of the line, came to the throne after Charles IV died. Charles VIII died in 1498 without any sons, and the throne passed to Louis, Duke of Orléans. He died in 1515 without a male heir and the throne passed to Francis of Angoulême. Francis was crowned Francis I and became the first of the Angoulême branch of the House of Valois. Henry III, who died in 1589, was the last of the Angoulêmes, and Henry IV, who followed him, was the first Bourbon. See also **Charles** (VIII); **Francis** (I) of France; **Henry** (III) of France; **Louis** (XII); **Philip** (VI).

Valparaíso (pop. 266,876) is the principal seaport and third largest city of Chile. Valparaíso lies on a wide inlet of the Pacific Ocean about 110 kilometres northwest of Santiago. For location, see **Chile** (political map). *Valparaíso* is Spanish for *Valley of Paradise.*

Valparaíso is a modern city and an important manufacturing centre. The chief products include cotton goods, machinery, refined sugar, tobacco, and alcoholic beverages. The National Congress of Chile moved to Valparaíso from Santiago in 1990. The city has many fine public buildings and schools. An electric railway joins Valparaíso with Santiago, and another line joins the city with the mining section of inland Chile. In 1906, a severe earthquake destroyed parts of the city.

Value, in colour. See **Colour** (The Munsell colour system; illustration).

Value, in economics, means the power of a commodity to command other commodities in exchange. Value relates to the terms upon which one commodity exchanges for others. It must not be confused with price. A commodity's *price* means its exchange power in terms of money (see **Price**). Its *value* means its exchange power in terms of other commodities.

Value and utility. In order to possess value, an article must have *utility*—that is, it must have the power to satisfy a want. For example, farm products always have value because everyone desires them. So farmers can usually find a market for their products. The desire for articles must be backed by purchasing power. No article will have any value if those who want it have no money or commodities to offer in exchange for it.

Value and scarcity. In order to possess value, an article must be scarce. That is, it must be so limited in quantity that those who have it are able to get something else in exchange for it. Air, which has great utility, seldom has any value. There is so much of it that ordinarily everyone can have any quantity without paying for it. But under certain conditions, air does have commercial value. For example, compressed air is bought and sold.

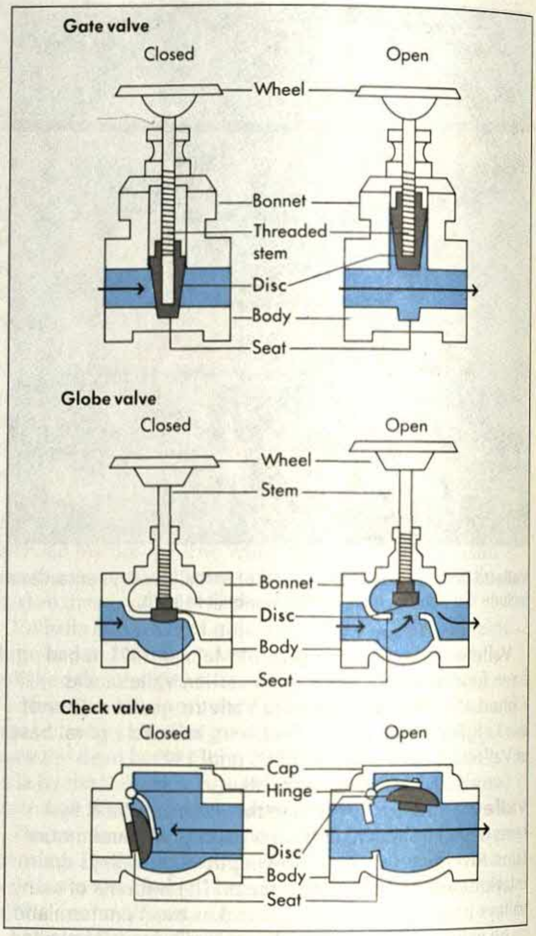
Value-added tax (VAT) is a tax imposed by a government at each stage in the production of a good or service. The tax is paid by every company that handles a product during its transformation from raw materials to finished goods. The amount of the tax is determined by the amount of the value that a company adds to the materials and services it buys from other firms.

Suppose that a German company making notebooks buys paper, cardboard, and glue worth 1,000 German marks. Then this company adds 500 marks in labour costs, profits, and depreciation, and sells the notebooks for 1,500 marks. The value-added tax at this stage is calculated on the 500 marks. The companies that had sold the paper, cardboard, and glue to the notebook company would also pay a tax on their value added. In this way, the total amount of value added that is taxed at each stage of production adds up to the total value of the final product.

Firms that pay VAT collect it from buyers of their products. From the amount collected, most firms can deduct the VAT paid on their own purchases, to calculate how much VAT to pass to the government. As a result, the burden of value-added tax falls on the consumer. In this sense, the final effect is equal to that of a retail sales tax. The tax is levied at a fixed percentage rate and generally applies to all goods and services. However, some countries have more than one VAT rate. In these nations, the less necessary a product is considered to be, the higher the rate will be.

In 1954, France became the first country to adopt a value-added tax. Today, this tax is growing in popularity, and about 40 countries use it. Many large industrial nations, particularly in Europe, use it.

Valve is a term used for various mechanical devices which open and close to control the flow of fluids in pipes and vessels. The term is also used in physiology for natural growths in the body which serve much the same purpose as mechanical valves. Among these are the valves of the heart, which open and close to control the flow of blood circulating through the chambers of the heart.



Principal types of valves. The nonautomatic gate and globe valves are used to turn on or shut off the flow of liquids. The check (automatic valve) allows a liquid to flow in one direction, but it closes shut to stop flow in the opposite direction.

Mechanical valves include *check valves, relief valves, manual valves,* and *automatic control valves.* Check valves and relief valves allow flow in one direction only. In a check valve, a gate or disc covers an opening called the *seat.* Gravity or a spring holds the disc in place. Pressure on one side of the disc forces the valve open. But pressure on the other side pushes the disc into the seat, preventing flow. In a relief valve, the disc is held closed by a compressed spring on one side. It opens only when pressure against the other side of the disc is greater than that of the spring.

Manual valves are controlled by hand. The common water tap is a manual valve. Automatic control valves are controlled by some external power source, such as electricity or compressed air. These valves have become important in industry because hundreds of them can be operated from a central location by a computer or a device called a *controller.*

See also **Carburettor; Petrol engine; Safety valve.**

Vampire is a corpse that supposedly returns to life at night to suck people's blood. According to folk stories, a vampire must have a supply of fresh blood obtained by biting the neck of sleeping victims. The victims lose strength, die, and become vampires themselves.

Stories of vampirelike creatures have come from many parts of the world. But most vampire tales originated in eastern European and Balkan countries, such as Albania, Greece, Hungary, and Romania. There are many superstitions about vampires. People who commit suicide, die violently, or are condemned by their church supposedly become vampires. According to folklore, a vampire can be destroyed by driving a wooden stake through its heart. In Europe, from the late 1600's to the early 1800's, people dug up graves looking for vampires.

See also **Dracula; Stoker, Bram.**

Vampire bat is the name given several different bats. The name is given particularly to certain bats in Central America and tropical America, which attack horses, cattle, fowl, and other warm-blooded animals, and drink their blood. The best known is the *common vampire bat,* a small reddish-brown animal about 8 centimetres long. It has very sharp triangular-shaped front teeth, which cut like a razor. Its oesophagus is short and narrow, and will permit nothing but fluids to pass.

Vampire bats sometimes attack people who are sleeping. The bite itself is harmless and soon heals, but vampire bats may carry rabies. Vampire bats have destroyed livestock and other animals in some localities, and have also been known to infect human beings.

Weird stories have been told about the viciousness of these mammals. Their peculiar name comes from the superstitious legends about the vampire, an imaginary being that sucked the blood from people.

Vampire bat

Scientific classification. True vampire bats make up the vampire bat family, Desmodontidae. The common vampire bat is genus *Desmodus.*

See also **Bat; Vampire; Stoker, Bram.**

Vanadium, a chemical element with symbol V, is a silvery-white metallic element. It occurs throughout the earth's crust, but only in extremely small quantities. Such trace amounts of vanadium also have been found in meteorites.

Vanadium is used chiefly by steel manufacturers, who produce it in the form of an iron alloy called *ferrovanadium.* Vanadium strengthens steel by improving both its hardness at high temperatures and its ability to withstand shock. It also makes steel resistant to corrosion. Manufacturers use this strong, rust-resistant alloy steel in producing axles, gears, and springs for aeroplanes, cars, and locomotives. High-speed cutting tools also are made of alloy steel containing vanadium. Vanadium resists attack by many chemicals, but it allows neutrons to penetrate readily. These properties make the metal suitable for use in nuclear reactors.

Vanadium compounds also have a variety of uses. *Vanadium pentoxide* and *vanadium oxytrichloride* serve as *catalysts* (substances that speed up chemical reactions). These catalysts aid the production of synthetic materials and industrial chemicals. Vanadium pentoxide and many other vanadium compounds are used in dyes, glazes, and glass colouring.

Vanadium is considered to be an essential trace element in the human body. However, research suggests that elevated levels of the element are related to manic depression and other disorders.

The atomic number of vanadium is 23, and its atomic weight is 50.9415. It has a density of 6.1 grams per cubic centimetre at 20° C. It melts at 1890 ± 10° C and boils at 3380° C. It was first recognized as a new element in 1801 by Andrés Manuel del Río, a Mexican mineralogist. But del Río later thought it was impure chromium. Nils Sefström, a Swedish chemist, rediscovered vanadium in 1830 and named it after Vanadis, the Scandinavian goddess of beauty.

Vanadium never occurs alone in nature. It is found combined with other elements in more than 60 minerals. For example, vanadium is combined with uranium in the ore carnotite, with sulphur in patronite, and with lead in vanadinite. A major commercial source is titaniferous magnetite, an iron ore found chiefly in Finland, Russia, and South Africa.

Van Allen, James Alfred (1914-   ), an American physicist, discovered the Van Allen belts, two zones of electrically charged particles that surround the earth. His team of scientists used data from the United States Explorer and Pioneer satellites to make the discovery in 1958. See **Van Allen belts.** Van Allen was born in Mount Pleasant, Iowa, and graduated from Iowa Wesleyan College and the University of Iowa. He was head of the University of Iowa department of physics and astronomy from 1951 to 1985.

Van Allen belts, also called *radiation belts,* are two zones of electrically charged particles that surround the earth high above its surface. The belts were named after James A. Van Allen, an American physicist, who discovered them in 1958. He based his discovery on data from the Explorer I satellite. The belts surround the earth like doughnuts. The inner belt extends from about 1,000 to 5,000 kilometres above the earth. The outer belt reaches from about 15,000 to 25,000 kilometres.

The radiation in the belts consists of high concentrations of charged particles, such as protons and electrons. The earth's magnetic field traps such particles and directs them toward the magnetic poles. The trapped particles spiral along a system of imaginary lines of the magnetic field. These *field lines* curve from the north magnetic pole to the south magnetic pole. As the charged particles approach either pole, the converging field lines reflect them back toward the opposite pole. This effect keeps particles in the belts bouncing between the poles.

The inner belt traps particles set free from the earth's atmosphere by *cosmic rays,* high energy particles from outer space. The outer belt acquires particles from the *solar wind,* a continuous stream of charged particles from the sun, and from *solar flares,* violent eruptions on the sun's surface. Intense solar activity disrupts the belts and leads to *magnetic storms.* Disruptions of the belts also interfere with radio reception and cause surges in power transmission lines, as well as producing auroras.

Like the earth, Jupiter, Saturn, Uranus, and Neptune are surrounded by magnetic fields. In the 1970's and 1980's, the *Voyager* space probes found evidence that these planets also have radiation belts.

See also **Aurora; Earth** (diagram: The earth has a magnetic "tail"); **Magnetic storm; Van Allen, James A.**

Vanbrugh, Sir John (1664-1726), was an English playwright and architect. His plays lightly satirize London high society, but they sometimes seriously criticize social values and institutions. Vanbrugh's first and most famous comedy, *The Relapse* (1696), ridicules sentimental comedies in which villains suddenly reform at the end. It also shows how mistreatment can tempt good people to act badly. *The Provok'd Wife* (1697) deals with an unhappy marriage.

The buildings Vanbrugh designed are large, ornate, and almost overpowering in the fashion of his time. His most famous building is Blenheim Palace, near Oxford, England. Vanbrugh also designed Castle Howard in Yorkshire and the Queen's Theatre in London. He helped design the Clarendon Building in Oxford. He was born in London.

See also **Churchill, Sir Winston** (picture: Blenheim Palace).

Van Buren, Martin (1782-1862), was president of the United States from 1837 to 1841. A Democrat, he served as president during the nation's first great depression, the Panic of 1837.

Van Buren was born in Kinderhook, New York, U.S.A. He became a lawyer, and was admitted to the bar in 1803. In 1816, he was elected to the New York Senate, and in 1820, he was appointed attorney general of New York. Van Buren was elected to the U.S. Senate in 1821. Reelected in 1827, he soon became a supporter of Andrew Jackson for the presidency.

In 1828, Van Buren was elected governor of New York. He served as governor for only two months, then resigned to become secretary of state under President Jackson. In that post, Van Buren successfully pressed claims for damages to U.S. shipping by French and Danish warships during the Napoleonic Wars of the early 1800's.

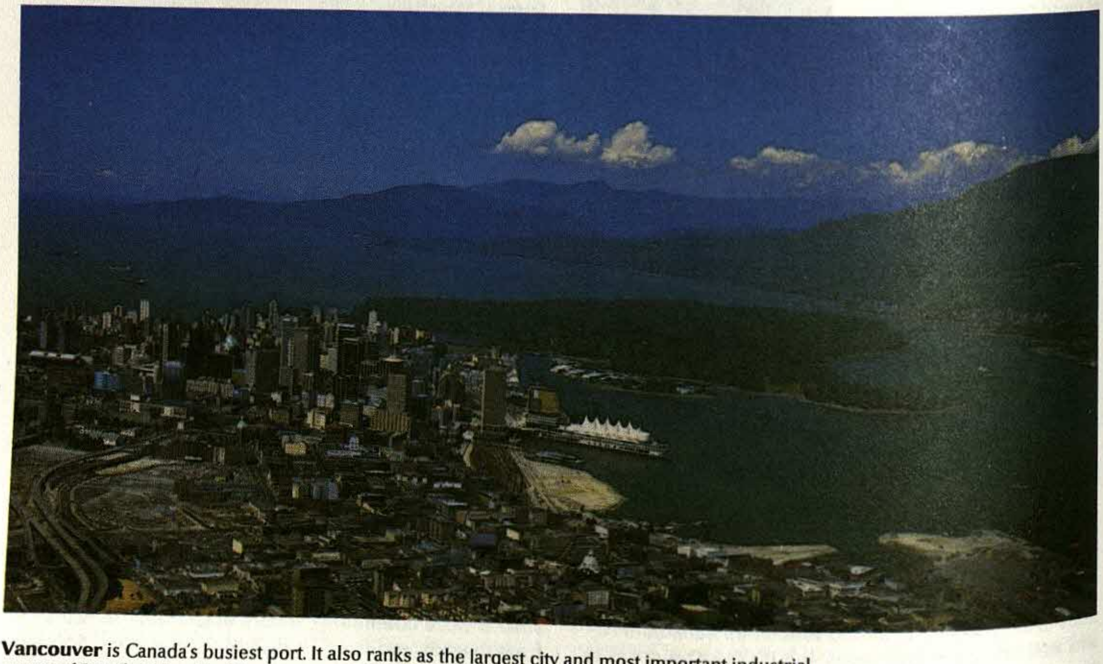
In 1832, Van Buren was elected vice president under Jackson. With Jackson's support, Van Buren easily won the Democratic nomination for president in 1836. He defeated William Henry Harrison, the main Whig candidate, in the general election.

The Panic of 1837 began in May. It brought financial ruin and misery to millions. Many turned to the government for help, but Van Buren refused all calls for public aid. Van Buren was defeated for reelection in 1840 by Harrison.

Van Buren remained active in politics for more than 20 years. As the candidate of the antislavery Free Soil Party, he ran again for president in 1848, but lost.

Vancouver (pop. 431,147; met. area 1,380,729) is the largest city in British Columbia and the busiest port in Canada. It also ranks as one of the largest cities in Canada. The people who live in the Vancouver metropolitan area make up about half the entire population of British Columbia. The city is the province's major centre of commerce, culture, industry, and transportation.

Vancouver lies in southwestern British Columbia, about 40 kilometres north of the Canadian-United States border. The city's chief asset is its natural harbour in Burrard Inlet. Ships can use the port throughout the year because the harbour's waters never freeze. Vancouver is often called *Canada's Gateway to the Pacific.*



Vancouver is Canada's busiest port. It also ranks as the largest city and most important industrial centre of British Columbia. Skyscrapers rise near the harbour. The waterfront building with the unusual saillike roof, *centre,* is a convention centre.

The first permanent settlement on the site of what is now Vancouver grew up near a sawmill that had been built in 1865. Rich timber resources helped the settlement become a bustling logging town. In 1884, the Canadian Pacific Railway (now CP Rail) chose the site as the western terminal of Canada's first transcontinental railway.

Vancouver covers about 115 square kilometres on the southern shore of Burrard Inlet. The city lies in a beautiful setting, near the Coast Mountains and the ocean. The protective mountains, and warm winds blowing in from the Pacific, help provide a surprisingly mild climate for a city so far north. Vancouver's temperatures average 2° C in January and 17° C in July.

The Vancouver metropolitan area, called *Greater Vancouver,* occupies 2,786 square kilometres. Greater Vancouver is Canada's third largest metropolitan area. Only the Montreal and Toronto metropolitan areas have larger populations.

People. About 70 per cent of Vancouver's people were born in Canada. People of British ancestry make up the largest group. Other large groups, in order of size, include those of Chinese, German, Italian, or Asian Indian descent. The first Chinese residents came to the Vancouver area during the late 1800's to help build the Canadian Pacific Railway.

Vancouver's mild climate has helped make the city a popular retirement centre. The climate also attracts large numbers of young people from other parts of Canada. But many of them lack job skills and cannot find work. As a result, they contribute to the city's relatively high rate of unemployment. Poverty is another major problem in Vancouver. Most of the poor live in rundown buildings just east of the city centre and in parts of the East End.

Economy. Vancouver is Canada's busiest port. Vancouver's port handles about 60 million metric tons of cargo annually. It serves as the main centre for the distribution of goods shipped between Canada and Asia. The port is also the centre of an important northern coastal trade. More than 50 steamship lines serve Vancouver.

Vancouver is the largest wholesale and retail trading centre of Western Canada. About 100,000 workers in Greater Vancouver are employed by wholesale and retail companies. Almost every large business in British Columbia has its headquarters in the city. The tourist industry ranks among Vancouver's fastest-growing sources of employment.

The area's leading industries are food processing and the manufacture of wood and wood products. Fish processing and meat packing rank as the chief activities of the food products industry. Vast evergreen forests in and near Greater Vancouver provide the raw materials for the area's sawmills, pulp and paper mills, and veneer and plywood factories.

Vancouver, George (1758-1798), was a British explorer. Vancouver Island, in British Columbia, Canada, and cities in British Columbia and in the state of Washington, U.S.A., are named after him.

Vancouver was born at King's Lynn, Norfolk, England. He entered the navy as an able seaman at the age of 13. His early experiences were on Captain James Cook's two last voyages (see **Cook, James**). Vancouver served as a midshipman on the last voyage.

George Vancouver

An incident concerning Nootka Sound, off the west coast of Vancouver Island, threatened war between Great Britain and Spain. Vancouver was ordered there, and he sailed in April, 1791. He sailed by way of the Cape of Good Hope, Australia, and New Zealand, following Cook's example. He made valuable maps of the coasts of these areas. He reached the American continent in 1792. Vancouver participated in certain formalities involving Nootka Sound, and then sailed through Juan de Fuca Strait and around Vancouver Island, becoming the first white person to sight the Strait of Georgia. He surveyed the Pacific Coast north of San Francisco for the first time. He returned to England via Cape Horn in 1795. His book, *A Voyage of Discovery to the North Pacific Ocean and Round the World in the Years 1790-1795,* was published in 1798.

Vancouver Island is the largest island on the Pacific Coast of North America, and an important part of the Canadian province of British Columbia. Vancouver Island extends for 459 kilometres along the southwestern coast of Canada and is from 64 to 130 kilometres wide. The island covers 31,284 square kilometres. Victoria, the largest city on the island, is the capital of British Columbia. The other chief cities are Nanaimo and Port Alberni. The total population of the island is 498,713.

Vancouver Island is separated from the mainland of British Columbia by Queen Charlotte Strait, Johnstone Strait, and the Strait of Georgia. Juan de Fuca Strait lies south of the island. Vancouver Island has the mildest climate in Canada because of the Japan Current. There is little winter in the southern part around Victoria, but in the northern and western mountains the winters are often severe.

The slopes of the mountains on Vancouver Island are covered with fir, cedar, and hemlock forests. Logging is the chief industry. The island has several large pulp mills, sawmills, and plywood plants. Farms are cultivated in the valleys. The southeast coast produces many berries and flower bulbs. Excellent game fishing attracts many tourists.

In 1774, the Spanish explorer Juan Perez became the first European to sight Vancouver Island. In 1778, the British navigator James Cook became the first European to land on the island. George Vancouver, a member of Cook's expedition, returned to Vancouver Island in 1792 and sailed around it. The island is named after him. See **Vancouver, George.**

Vandalism is criminal damage to property. It includes breaking the windows of public or privately owned buildings, painting slogans on the walls of public places, breaking furniture or machinery, and many other forms of damage. Vandalism may be an act of revenge or a way of expressing a political opinion. Both young people and adults sometimes commit the crime just for "fun." For example, football fans may tear down the goal posts after an important game.

In many countries, the damage caused by vandalism costs large sums of money every year. In most cases, the costs are paid by the business, school, or government that has been vandalized, or by individual victims.

Vandalism is punishable by fine or imprisonment. Some local governments have laws that hold parents responsible for vandalism committed by their children. But most acts of vandalism are not punished. Law enforcement is difficult in such cases, and the cost of most individual acts of damage is not large enough to make legal action worthwhile.

Vandals were a Germanic tribe of barbarians that invaded the West Roman Empire during the early A.D. 400's. The Vandals invaded the empire along with other barbarians and helped bring about the empire's decline. The Vandals were no more destructive than other barbarians, but the word *vandal* has come to mean someone who destroys or damages valuable things (see **Vandalism**).

The Vandals probably originated in what is now southern Scandinavia. By A.D. 100, they had settled in what are today the regions of Silesia and Galicia in southern Poland. The Vandals moved west from this area in the late A.D. 300's, partly because they were threatened by the Huns and other peoples from the east. In 406, the Vandals crossed the Rhine River and looted Gaul (now France), an area controlled by Rome. In 409, they crossed the Pyrenees Mountains and entered Spain, where they became a major power.

The Vandals reached the peak of their power under the Vandal king Genseric (or Gaiseric), who ruled from 428 to 477. In 429, the Vandals invaded northern Africa, where they quickly conquered a number of Roman provinces and established a strong kingdom. From their base in northern Africa, the Vandals dominated the western Mediterranean Sea. They looted Rome in 455. An army from the Byzantine Empire conquered the Vandal kingdom in northern Africa in 533 and 534.

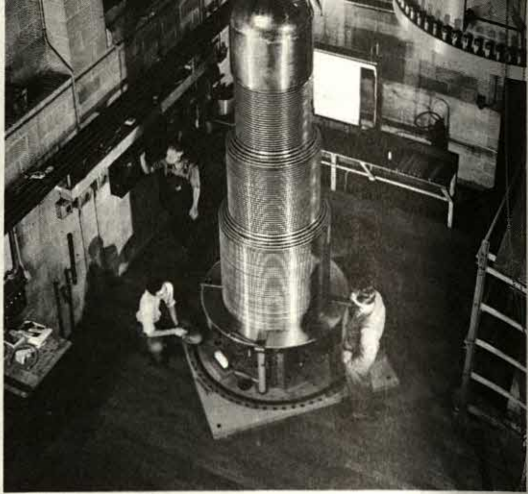
Van de Graaff generator, also known as an *electrostatic generator,* is a device for building up a high electrical charge. It is a source of charged particles that may be used for atom smashing. In general, the generator is used to boost protons and other nuclear particles to an energy of about 10 million electronvolts (10 MeV). The chief value of the machine is that narrow beams of protons of known energies can be produced. Scientists use these beams to study nuclear forces.

Robert J. Van de Graaff made the first generator of this kind. In the generator, a continuous belt of an insulating material moves past a source of negative or positive electricity. This source sprays electrons or ions on the belt. The belt then goes into a hollow metal dome where a fine metallic brush moves the electrons or ions onto the dome surface. When the charge at the top of the dome is high enough, electrically charged particles are hurled from the top at targets at the bottom of the generator.

One problem with the Van de Graaff machine is the leakage of stored charge. To prevent leakage, a gas such as Freon or air under pressure as high as 10.5 kilograms per square centimetre is put in a pressure vessel enclosing the machine.

An extension of the Van de Graaff generator is the *tandem Van de Graaff.* In this machine, higher energies are produced by doubling the number of accelerations.

See also **Particle accelerator.**



The first Van de Graaff generator was built at the Massachusetts Institute of Technology, in the U.S.A., in 1931. Physicists use these particle accelerators for nuclear research.

Van Den Bosch, Johannes (1780-1844), was governor general of the Netherlands East Indies (now Indonesia) from 1830 to 1834. Historians remember him for introducing the cultivation system to Java. Under this system, the Dutch forced the Javanese to grow certain crops. This saved the Netherlands from financial ruin, but was disastrous for the Javanese.

Van Den Bosch was born in Gelderland in the Netherlands. He became a lieutenant in the army when he was 17. In 1798, he was given an appointment in Batavia (now Jakarta). In 1810, Van Den Bosch sailed for the Netherlands. He was captured by a British ship and taken to the United Kingdom. He was released in 1813. Van Den Bosch was appointed governor general of the Netherlands East Indies in January 1830. On his return to the Netherlands in 1834, he was made minister for the colonies. He held this post until 1839.

Van der Bijl, Hendrik Johannes (1887-1948), was a South African engineer, inventor, and industrialist. He was born in Pretoria, South Africa. He studied science at Victoria College, Stellenbosch, and then moved to Germany. He moved to the United States in 1913.

In the U.S.A., Van der Bijl was partly responsible for setting up the first transcontinental radio link from the Atlantic to the Pacific coasts. He pioneered the first device for *scrambling* (putting into secret code) radio speech. He also engineered the first transmission of the human voice by shortwave radio from New York to Paris.

In 1920, he became technical adviser to the South African Industrial Development Corporation. He was founding chairman of the Electricity Supply Commission and the Iron and Steel Corporation. These huge semi-state bodies launched South Africa's industrial growth in the 1920's and 1930's. During World War II (1939-1945), Van der Bijl was director general of war supplies.

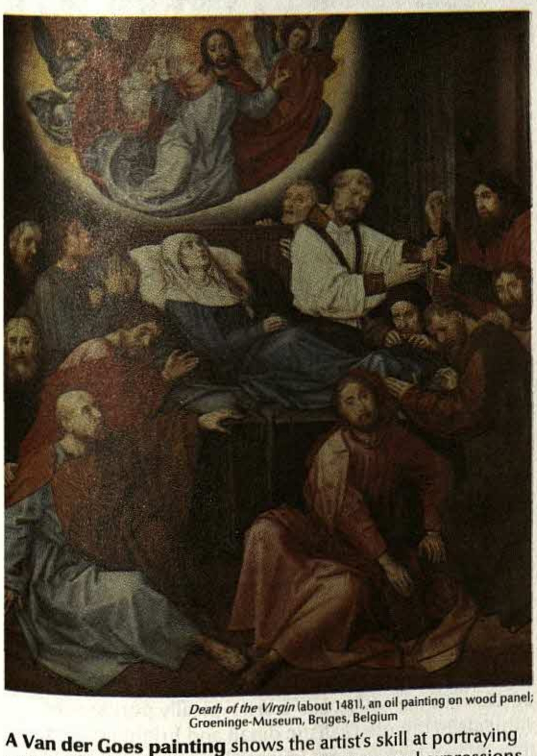
Vanderbilt, Cornelius (1794-1877), was the most successful and powerful American businessman of his time. He made his fortune in steamship lines and railways but also had investments in manufacturing and banking.

Vanderbilt was born in Port Richmond on Staten Island, New York. At the age of 16, he bought a small boat, which he used to carry freight and passengers between Staten Island and New York City. He formed a steamship company in 1829 and soon dominated shipping along the Atlantic coast and on the Hudson River. By the mid-1850's, his ships made regular trips to and from Europe, and he had become the leading American steamship owner. In 1865, Vanderbilt gained control of the Hudson River Railroad. By 1873, he owned rail lines that extended as far west as Chicago.

Vanderbilt helped build the U.S. transportation system. But in several cases, he used questionable business tactics. These actions helped create unstable conditions in the stock market, which drove many firms into bankruptcy. At his death, Vanderbilt left a fortune of over 105 million U.S. dollars, the largest in U.S. history up to that time.

Van der Goes, Hugo (1440?-1482), was the leading Flemish painter of religious subjects and portraits of his generation. His pictures reflect the influence of the Flemish painters Jan van Eyck in their rich detail and Rogier van der Weyden in their dramatic poses. Van der Goes's paintings, however, communicate a more emotional, intense feeling through the individualized posture, gestures, and expressions of his solidly formed figures. These figures range from earthy peasants to the Holy Family.

Van der Goes painted many large-scale religious works, frequently emphasizing such highly emotional subjects as the death of the Virgin Mary. One of his famous paintings is a *triptych* (three-panelled painting), the Portinari Altarpiece.



Death of the Virgin (about 1481), an oil painting on wood panel; Groeninge-Museum, Bruges, Belgium

A Van der Goes painting shows the artist's skill at portraying emotional subjects through gestures, posture, and expressions.

Little is known about Van der Goes's early life. In 1467, he was accepted as a master in the artists' guild in Ghent. About 1475, he entered a monastery near Brussels as a lay brother. His complex personality was marked by periods of melancholy, which may account for expressionistic aspects of his paintings.

Van der Waals, Johannes Diderik. See **Nobel Prizes** (table: Nobel Prizes for physics—1910).

Van der Weyden, Rogier (1399?-1464), was a Flemish painter of portraits and religious subjects. In his religious paintings, van der Weyden focused attention on the emotional responses of elegant and graceful groups of figures. But the artist also distanced the viewer from the intensity and immediacy of the religious experience in a variety of ways. For example, he sometimes placed his figures against a gold background, as in *The Descent from the Cross* (about 1435), which is reproduced in the **Painting** article. In some paintings, van der Weyden deliberately avoided integrating the figures into the detailed setting, often arranging them to create a rhythmic surface pattern. Some paintings include painted sculptural archways that function as frames for the subject matter.

Van der Weyden was born in Tournai, Belgium. He moved to Brussels in the 1430's, where he was appointed "painter of the town." His workshop included many apprentices and his style influenced Flemish, German, and French art for many years. He received commissions from the court of Burgundy that resulted in portraits preserving the haughty manner and proud bearing of the Burgundian nobles.

See also **Painting** (The Flemish style).

Van Diemen, Anthony (1593-1645), was governor general of the Netherlands Indies (now Indonesia) from 1636 to 1645. He greatly extended Dutch interests by capturing Melaka from the Portuguese. Today, he is best remembered as the man who sent the Dutch explorer Abel Tasman on his voyage around Australia in 1642. Tasman named an island Van Diemen's Land (now Tasmania) in his honour.

Van Diemen was born in Culemborg in the Netherlands. His father was mayor of Culemborg. Van Diemen sailed to the Indies in 1618. He rose rapidly in the colonial administration, and in 1627 he became director general, the second highest position in the Indies. He returned to the Netherlands in 1631. In 1632, Van Diemen was sent again to the Indies. He was appointed governor general in 1636, and held the post until he died nine years later.

Van Diemen's Land. See **Tasmania** (History).

Van Doren, Carl (1885-1950), was an American biographer and critic. He won the 1939 Pulitzer Prize for biography for his book *Benjamin Franklin* (1938), about the American statesman and scientist. Van Doren also wrote *Swift* (1930), a biography of the English author Jonathan Swift, and *Jane Mecom* (1950), which is a book about Benjamin Franklin's sister.

Van Doren wrote many critical essays about American authors. Much of his literary criticism was collected in *The Roving Critic* (1923) and *Many Minds* (1924). He wrote a number of books about the American Revolution (1775-1783). They include *Secret History of the American Revolution* (1941) and *Mutiny in January* (1943). He also wrote an autobiography, *Three Worlds* (1936).

Carl Clinton Van Doren was born in Hope, near Urbana, Illinois. His younger brother, Mark Van Doren, was also a noted author.

Van Doren, Mark (1894-1972), was an American poet, critic, and educator. He won a Pulitzer Prize in 1940 for his *Collected Poems* (1939).

Many of Van Doren's poems describe the beauty of nature and New England's changing seasons. Others are based on American legends. Some poems that Van Doren wrote in the 1940's reflect his sombre thoughts about World War II (1939-1945). These poems are included in *Collected and New Poems: 1924-1963* (1963). In *Good Morning: Last Poems* (published in 1973), he expressed calm acceptance of the prospect of death.

Van Doren's career as a critic began with *Henry David Thoreau* (1916), a study of Thoreau's writings. He also wrote essays on the works of other writers, including John Dryden, Nathaniel Hawthorne, and William Shakespeare. His major critical writings appear in *Private Reader* (1942) and *The Happy Critic* (1961). He also wrote novels, plays, short stories, and *Autobiography* (1958).

Mark Albert Van Doren was born in Hope, near Urbana, Illinois. He taught at Columbia University, New York City, from 1920 to 1959. His older brother, Carl Clinton Van Doren, was also a noted writer.

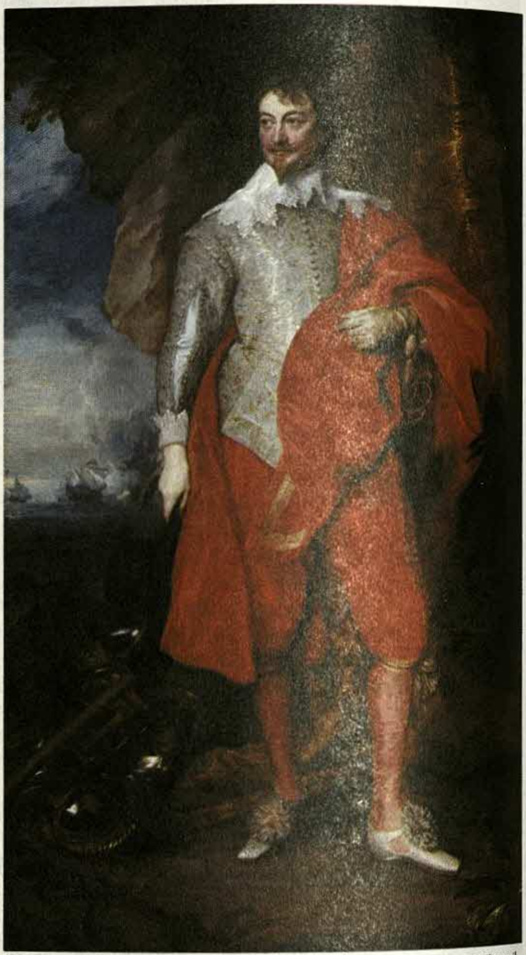
Van Druten, John William (1901-1957), was a playwright who became known for his polished comedies. His plays are noted for their sophisticated dialogue and strong portrayals of women. Van Druten's comedies include *Old Acquaintance* (1940), *The Voice of the Turtle* (1943), *I Remember Mama* (1944), and *Bell, Book and Candle* (1950). He adapted his best-known serious play, *I Am a Camera* (1951), from Christopher Isherwood's stories, *Goodbye to Berlin*.

Van Druten was born in London and taught at University College, Wales. He turned to literature as a career after *Young Woodley* (1925), his second play, succeeded in New York City. The play had been banned in England as an attack on its private school system. Van Druten emigrated to America in 1926, and became a United States citizen in 1944.

Van Dyck, Sir Anthony (1599-1641), was one of the most popular portrait painters of his time. He is sometimes known as Anton Van Dyck. The artist was sought after by the royalty, aristocracy, and upper-middle class of Flanders, Italy, and especially England. Van Dyck also painted religious and mythological pictures, and was a fine engraver and etcher.

Van Dyck's style of portrait painting typically emphasized the elegance and wealth of his subjects. He often slightly exaggerated the height of the figure, and lengthened the outline of the hands to suggest greater refinement and stature. Many of Van Dyck's figures are dressed in luxurious clothing painted in rich colour. The settings characteristically include elegant furniture, draped tapestries, imported rugs, and large architectural elements such as columns.

Van Dyck was born in Antwerp, Belgium. He showed great talent for painting as a boy and had his own studio and pupils at the age of about 16. From about 1618 to 1620, he worked with the famous Antwerp painter Peter Paul Rubens. Van Dyck visited England briefly in 1620 and lived in Italy from 1621 to about 1627. Van Dyck's portraits of the nobles of Genoa and their children rank among his finest works. His Italian paintings reflect the influence of the warm colours and loose brushwork of the Venetian Renaissance painter Titian.



Robert Rich, Earl of Warwick (about 1635), an oil painting on canvas; the Metropolitan Museum of Art, New York City

A typical Van Dyck portrait shows a full-length figure posed against a landscape background. The portrait above illustrates Van Dyck's drawing skill and his ability to paint rich fabrics.

After leaving Italy, Van Dyck returned to Antwerp. He went to England in 1632, where King Charles I made him court painter. Van Dyck painted about 350 portraits while in England, including about 40 of the king. His famous *Portrait of Charles I Hunting* (about 1635) appears in the **Painting** article. The portrait cleverly combines flattering aspects of the aristocratic hunt and references to Charles's authority as king. Van Dyck's portraits of the English court established a tradition followed by Thomas Gainsborough and Sir Joshua Reynolds, English portrait painters of the 1700's.

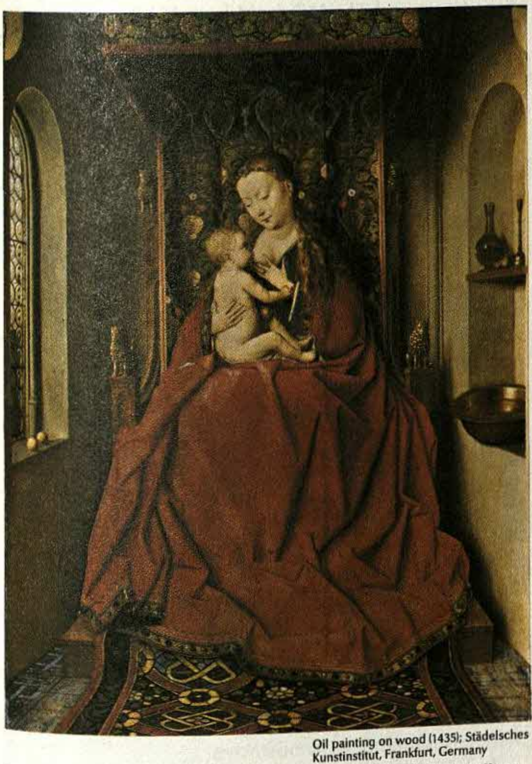
See also **Charles (I)** of England (picture); **Clothing** (pictures: The Ruff; Clothing of the 1600's).

Van Eyck, Jan (1380?-1441), was one of the greatest and most influential Flemish painters of altarpieces and portraits of the 1400's. His work typically portrays the subjects in minute realistic detail and bright colours. Although van Eyck did not invent oil painting, as has been previously thought, he achieved stunning effects with oils. He applied layer after layer of oil paint to achieve the effect of shimmering jewels or rich textures.

Many of van Eyck's paintings include what has been called *disguised symbolism.* The realistic objects in the pictures often have a deeper meaning related to the religious nature of the image. Examples of hidden symbolism appear in his painting *Portrait of Giovanni Arnolfini and His Wife* (also known as *The Arnolfini Wedding*), which is reproduced in the **Painting** article. Scholars generally believe that the painting depicts an Italian merchant and his bride. They have removed their shoes to indicate they stand on holy ground as they exchange wedding vows. The single burning candle in the chandelier symbolizes both the presence of Jesus Christ and the "marriage candle" that was part of the ceremony. The dog may symbolize fidelity in marriage. Van Eyck and a second individual served as the two required witnesses in such a wedding. They are reflected in the small mirror on the back wall.

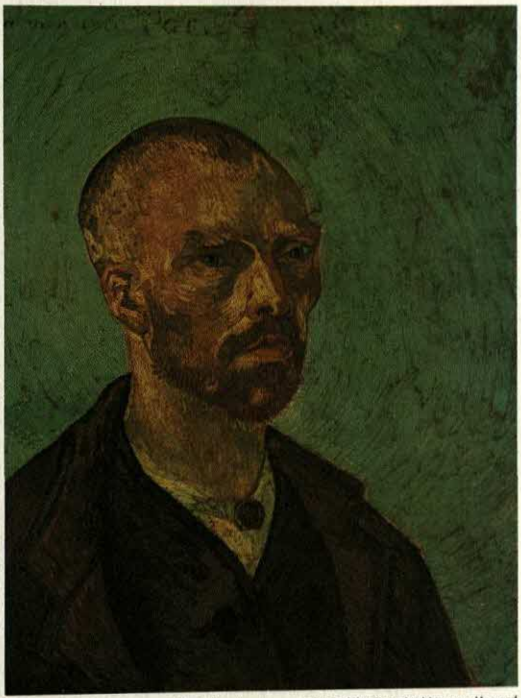
According to tradition, van Eyck was born in the province of Limburg, in the border region between the Netherlands and what is now Belgium. He worked for wealthy patrons. Van Eyck collaborated with Hubert van Eyck, probably his brother, on the large multipanel painting called the *Ghent Altarpiece* (1432).

See also **Painting** (The Flemish style); **Jerome, Saint** (picture); **Renaissance** (picture: A northern Renaissance painting).



Oil painting on wood (1435); Städelsches Kunstinstitut, Frankfurt, Germany

Van Eyck's *Lucca Madonna* shows the artist's skilful handling of light and his ability to paint fabrics and jewels in precise detail. Van Eyck's realistic style influenced many painters.



Oil painting on canvas; courtesy of the Fogg Art Museum, Harvard University, Cambridge, Massachusetts, U.S.A.

Van Gogh painted this self-portrait in 1888.

Van Gogh, Vincent (1853-1890), is one of the most famous painters in modern art. Yet during his lifetime, he received no recognition and sold only one painting. Van Gogh failed in every career he attempted and felt unloved and friendless. He turned to art to express his strong religious feelings and his deep need for love and respect. During the last five years of his life, van Gogh completed more than 800 oil paintings.

Van Gogh was born in Groot-Zundert, near Breda, the Netherlands. When he was 16 years old, his parents sent him to The Hague to work for an uncle who was an art dealer. Between 1873 and 1876, he worked for art dealers in London and Paris. But van Gogh was unsuited for a business career.

In 1878, van Gogh applied for admission to a theological school but was rejected. He then decided to become an unordained preacher and received his training from a missionary society in Brussels, Belgium. Late in 1878, van Gogh represented the society as a minister in the Borinage, a poor coal-mining district in Belgium. He took his work so seriously that he went without food and other necessities so he could give more to the poor. The missionary society objected to van Gogh's unorthodox behaviour and relieved him in the summer of 1879. Van Gogh began to draw while in the Borinage, and late in 1880 he decided to become a painter.

Van Gogh's first pictures were still lifes and scenes of peasants at work. He favoured dark brown and olive colours and heavy brushstrokes. *The Potato Eaters* (1885) is his finest and most ambitious work of this period. In 1886, he went to Paris to visit his brother Theo and was immediately attracted to the impressionist art he saw there. Under the influence of impressionism, van Gogh lightened his brushstrokes and used bright, clear colours.

In 1888, van Gogh moved to Arles in southern France. There, he painted his most expressive and original pictures. An example of his work of this period is *The Postman Roulin,* reproduced in the **Painting** article. In Arles, van Gogh suffered from occasional violent seizures, which were diagnosed after his death as epilepsy. The intense colour and slashing brushstrokes of van Gogh's paintings reflect his disturbed mind. An example is van Gogh's picture *The Night Café,* which is reproduced in the **Painting** article. During a seizure late in 1888, he threatened to kill the French painter Paul Gauguin, who was visiting him. Van Gogh cut off one of his own ears during this seizure. He committed suicide in 1890.

Throughout his life, van Gogh corresponded with his brother Theo and other people. Van Gogh's *Complete Letters,* published in three volumes in 1958, provide an intimate view of his life and thought. See **Letter writing** (picture).

See also **Impressionism; Expressionism.**

Vanguard. See **Space exploration** (The space race begins).

Vanilla is the name of a group of climbing orchids. The vanilla extract that is used to flavour chocolate, ice cream, pastry, and sweets comes from these plants. The vanilla vine has been cultivated in Mexico for hundreds of years. This type of vanilla has been introduced into other tropical areas. Comoros, Indonesia, Madagascar, and Reunion produce much of the world's vanilla. Another species grows on Tahiti in the South Pacific.

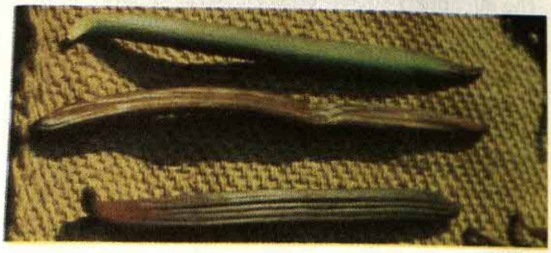
The vanilla vine has little rootlets by which the plant attaches itself to trees. The cultivated plant lives about 10 years. It produces its first crop after three years.

The plant produces a fruit in the shape of a cylindrical *pod* (bean) from 13 to 25 centimetres long. The fruit has an oily black pulp that contains many tiny black seeds. The pods are gathered when they are yellow-green in colour. Then the curing, or drying, process takes place. This process shrinks the bean and also turns it a rich, chocolate-brown colour. The process also gives the bean the flavour and aroma of vanilla as we know it.

Vanilla extract is prepared by a complicated and expensive process. The beans are chopped into small pieces and then percolated with alcohol and water. Food scientists have developed artificial vanilla flavours because of the high cost of vanilla.

Scientific classification. Vanilla is in the orchid family, Orchidaceae. The vine of Mexico and Madagascar is *Vanilla fragrans.*

A worker pollinates a vanilla flower, *above,* on a plantation in Mexico. Vanilla plants yield pods that are gathered when they are yellow-green. The pods are then cured, *below.*



Van Lawick-Goodall, Jane. See **Goodall, Jane.**

Van Leeuwenhoek, Anton. See **Leeuwenhoek, Anton van.**

Van Leyden, Lucas (1494?-1533), was a Dutch graphic artist and painter best known for his engravings. He became one of the first artists to design compositions in which the main character is not necessarily the largest or most centrally located figure. Lucas's engravings have been praised for their richly detailed landscape settings. He knew and admired the work of German engravers, especially Albrecht Dürer. However, his engraving style is less ornamental than theirs, using fine and precise strokes of the *burin* (engraver's cutting tool). This technique tended to create effects of light and shadow, rather than contour.

Lucas was born in Leiden, the Netherlands. The engravings he made between the ages of about 16 and 26 are considered his best and most original, including *Ecce Homo* and *The Milkmaid* (both 1510).

Van Rensselaer, Kiliaen (1595-1643), was one of the leading Dutch colonizers of the territory that later became New York, U.S.A. In 1629, the Dutch West India Company authorized large grants of land in New Netherland to company members who promised to colonize their lands. As a result, a class of great landowners, called *patroons,* developed. Kiliaen Van Rensselaer was the greatest of them. He established the manor of Rensselaerswyck, which included land on both banks of the Hudson River. He never visited his colony.

Van Riebeeck, Jan (1619-1677), was the Dutch commander of the first settlement at the Cape of Good Hope in southern Africa. Jan Antoniscz Van Riebeeck was born in Culemborg in the Netherlands. He joined the Dutch East India Company when he was 20, and was sent to Indonesia in 1640. He also worked in Japan and Indochina. Van Riebeeck was eventually sent home to the Netherlands, after he was accused of private trading. On the voyage back, the Dutch fleet called in at Table Bay, Cape of Good Hope. Van Riebeeck spent 18 days ashore and became convinced that the Cape could supply passing ships with fresh produce.

Back in the Netherlands, the Dutch East India Company offered him another opportunity. He was sent to the Cape to put his ideas into practice. His instructions were to plant a vegetable garden, build a protective fort, and trade cattle with the local inhabitants. He arrived in the Cape in 1652, and for the next 10 years, he worked hard overcoming many obstacles.

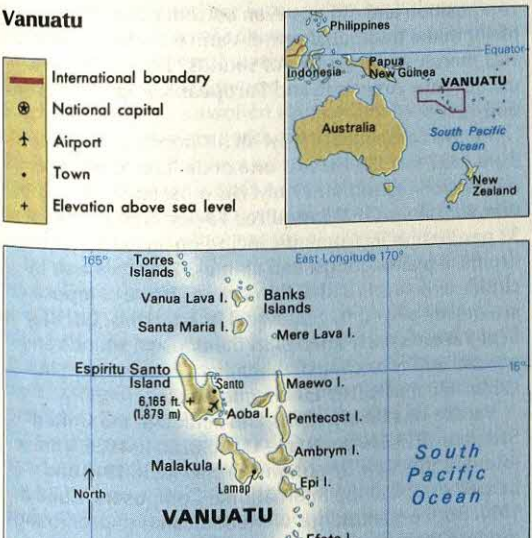
In 1662, Van Riebeeck was transferred to Batavia (now Jakarta, the capital of Indonesia). In 1665, he accepted the post of secretary to the Council of the Indies.

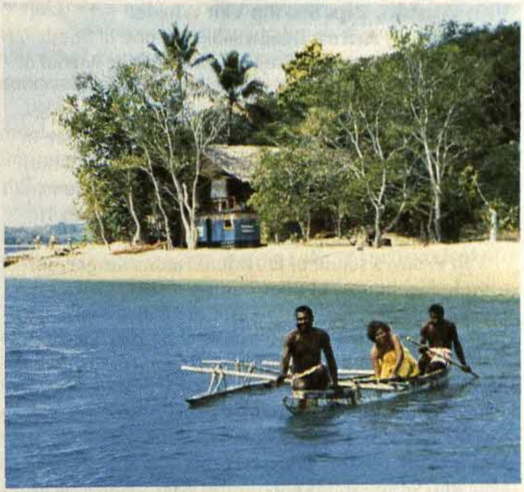
Vanuatu is an island country in the southwest Pacific Ocean. Vanuatu consists of 80 islands with a total land area of about 12,200 square kilometres. The largest islands are, in order of size, Espiritu Santo, Malakula, Efate, Erromango, and Tanna. Vanuatu has a population of about 173,000. Port-Vila (pop. 15,000)—on Efate—is the nation's capital and largest urban community. The national anthem is "Yumi, Yumi, Yumi" ("We, We, We").

From 1906 to 1980, the United Kingdom and France jointly governed the islands, which were then called the New Hebrides. In 1980, the islands became the independent nation of Vanuatu.

Government. Vanuatu is a republic. A Parliament, whose 46 members are elected by the people to four-year terms, makes the country's laws. A prime minister, who heads the majority party in Parliament, runs the government with the aid of a Council of Ministers. Village, regional, and island councils handle local government affairs. The Parliament and the regional council presidents elect a president to a five-year term. The president's role is chiefly ceremonial.

People. Over 90 per cent of Vanuatu's people are Melanesians. Asians, Europeans, and Polynesians make up the rest of the population. About three-quarters of the people live in rural villages. Many village houses are made of wood, bamboo, and palm leaves. Port-Vila and Santo—on Espiritu Santo—are the only urban communities. Over 100 languages are spoken in Vanuatu. Bislama, a type of *Pidgin English* that combines mainly English words and Melanesian grammar, is commonly used throughout the country (see **Pidgin English**). About 85 per cent of the people are Christians and most of the rest practise local religions.





Vanuatu consists of 80 islands in the southwest Pacific Ocean. People enjoy boating on sparkling blue water near the sandy shore of one of the islands, *above.*

Land and climate. The islands of Vanuatu form a Y-shaped chain that extends about 800 kilometres from north to south. Most of the islands have narrow coastal plains and mountainous interiors. Several have active volcanoes. The northern islands have a hot, rainy climate, with an all-year-round temperature of about 27 °C and annual rainfall of about 305 centimetres. Temperatures in the southern islands range from about 19 to 31 °C, and the yearly rainfall is about 230 centimetres.

Economy of Vanuatu is based on agriculture. Rural families produce nearly all the food they need. They grow fruit and vegetables, raise chickens and pigs, and catch fish. Some families produce *copra* (dried coconut meat) for sale. Tourism is important to the economy. Small ships and aeroplanes serve as the main means of transportation among the islands. Vanuatu has few good roads and no railways. The government publishes a newspaper and operates a radio station.

History. Melanesians have lived in what is now Vanuatu for at least 3,000 years. In 1606, Pedro Fernandez de Queirós (also spelled Quirós), the commander of a Spanish expedition from Peru, became the first European to see the islands. The British explorer James Cook mapped the region in 1774 and named the islands the New Hebrides after the Hebrides islands of Scotland.

British and French traders, missionaries, and settlers began to visit the islands during the 1820's. In 1887, Britain and France set up a joint naval commission to oversee the area. In 1906, it was replaced by a joint British and French government called a condominium.

After the United States entered World War II in 1941, the New Hebrides became an important Allied military base. A movement for independence began in the islands during the 1960's. The New Hebrides became the independent nation of Vanuatu on July 30, 1980.

In 1987, a hurricane struck Vanuatu. It caused a number of deaths and much damage.

See also **Climate** (picture: In Vanuatu).

Van Winkle, Rip. See **Rip Van Winkle.**

Van Wouw, Anton (1862-1945), was one of South Africa's foremost sculptors. He was awarded the Medal of Honour of the South African Academy in 1937.

Van Wouw was born in Driebergen, in the Netherlands. He studied at the Rotterdam Academy of Art. In 1890, his parents emigrated to Pretoria, capital of the South African Republic. There he worked as a gunsmith and gave private lessons in drawing and painting. He also submitted cartoons to the press.

Van Wouw's statue of President Paulus Kruger, surrounded by figures of Boer generals, stands in Church Square, Pretoria. *Women's Monument* in Bloemfontein, commissioned in 1912, is a tribute to the women and children who died in concentration camps during the Second Anglo-Boer War (1899-1902). Van Wouw was also known for his small works, especially of mine workers and Khoisan (see **Khoisan**).

Vapour, in physics, is the term applied to the gaseous state into which solids and liquids pass when they are heated. In a technical sense, both oxygen and steam are vapours. It is customary, however, to make a distinction between gases and vapours. Gases, such as oxygen, remain gases when compressed at ordinary temperatures. Vapours, such as steam, resume their liquid or solid state under high pressure at ordinary temperatures. The process of converting a substance from solid or liquid form into a vapour is called *vaporization. Evaporation* and *boiling* of liquids are forms of vaporization. In evaporation, the change to vapour takes place slowly. In boiling, it occurs very rapidly. The formation of vapour directly from a solid state is called *sublimation.*

Vapour in the atmosphere has an important relation to climate. Water vapour is always present in the air. When water vapour is condensed under varying atmospheric conditions, it forms clouds, dew, rain, and snow.

See also **Boiling point; Evaporation; Gas.**

Vapour lamp is a source of electric light that uses a vapour or gas, rather than a wire, to produce light. Vapour lamps are usually named after the major chemical element used in the vapour. Mercury and sodium are the most commonly used elements. The colour of the light depends on the type of vapour. Mercury vapour lamps produce greenish-blue light, while sodium vapour lamps give yellow light.

Vapour lamps are widely used to light such large areas as car parks and motorways. They produce more light per unit of electricity than incandescent lamps and may last up to 100 times as long. Fluorescent lamps are a kind of vapour lamp.

See also **Electric light.**

Vapour lock occurs in a petrol engine when some of the petrol boils in the fuel-supply system. Excessive heating of the engine may cause boiling, or *vaporization,* of the fuel. This reduces the amount of fuel pumped to the engine, because vapour takes up more space than liquid. The engine then runs erratically or stops until the vaporized petrol cools and turns to liquid. Vapour locks occur most often during long, steep climbs on hot days, or when slowing suddenly after a hard drive.

See also **Fuel injection.**

Vapour trail. See **Contrail.**

Varanasi (pop. 1,018,370) is an ancient holy city of the Hindus in northern India. The city, also known as Banaras or Benares, lies along a sandy ridge on the west bank of the Ganges River (see **India** [political map]).

Varanasi is one of the largest cities in the state of Uttar Pradesh. Products of the city include shawls, saris, gold-embroidered cloth, hand-hammered brassware, and heavy gold and silver jewellery. Varanasi is especially known for its fine silk fabrics.

The Ganges River is one of the greatest attractions of Varanasi. Devout Hindus make pilgrimages from all parts of India to bathe in the Ganges, whose water they believe to be sacred. Along the river, Hindus have set up stairways, known as *ghats,* from which they can bathe before saying their daily prayers. Each year, about a million pilgrims visit the city. Varanasi is also known for its large temples and its monasteries and palaces. The city is the site of Banaras Hindu University and other colleges.

See also **Asia** (picture: Hindus bathe in the Ganges River; **Uttar Pradesh**).

Vardon, Harry (1870-1937), a British golfer, was the only player to win the British Open Golf Championship six times. Vardon was among those who dominated British golf between 1894 and 1914. Vardon was born at Grouville, in Jersey. The *Vardon Trophy* is awarded annually to the British or U.S. golfer with the year's best average.

Varennes, Pierre Gaultier de. See **La Vérendrye, Sieur de.**

Varèse, Edgard (1883-1965), a French-born American composer, was a leading composer of the early 1900's. He refused to follow any school or system of musical composition and did not even consider himself a composer in the traditional sense. Varèse declared that he was merely an "organizer of sounds." His works influenced many American and European composers of the mid-1900's.

Varèse composed almost all his important works from 1921 to 1935. He was one of the first to write for percussion instruments only. His most famous composition, *Ionisation* (1931), requires 13 performers who play 39 percussion instruments, including an assortment of drums, a piano, gongs, and chimes. The work also includes two sirens and a "lion's roar." These compositions are mostly played by traditional instruments, but they reflect Varèse's early interest in the unusual sounds and precise ability to control them that he later found in electronic music (see **Electronic music**).

Varèse was born in Paris and settled in the United States in 1915. He became a U.S. citizen in 1926. Varèse founded the New Symphony Orchestra in 1919 and helped establish the International Composers' Guild in 1921. Both organizations were dedicated to promoting modern music.

Vargas Llosa, Mario (1936-), is the first Peruvian novelist to win international renown. Vargas Llosa often deals with the issues of violence and political corruption in Peruvian society. He uses experimental techniques, including intermingled plotlines, shifting time frames, and multiple points of view, to express his themes. Much of his fiction also reveals his skill as a storyteller.

Vargas Llosa's first novel, *The Time of the Hero* (1963), explores the theme of injustice through a tale of theft and murder in a military academy. *The Green House* (1966) examines conflicts among Peru's economic classes and its ethnic and regional groups. In *Conversation in the Cathedral* (1969), Vargas Llosa explores hypocrisy and corruption in Peruvian business and politics. *The War of the End of the World* (1981) is a historical novel about a rebellion in Brazil. Vargas Llosa's other novels include the humorous *Captain Pantoja and the Special Service* (1973) and *Aunt Julia and the Scriptwriter* (1977); *The Real Life of Alejandro Mayta* (1984); and *In Praise of the Stepmother* (1990).

Vargas Llosa was born in Arequipa. In 1989 and 1990, he campaigned unsuccessfully for election as president of Peru. In addition to novels, Vargas Llosa has written essays, drama, and short stories.

See also **Latin-American literature** (Recent developments).

Variable star. See **Star** (Variable stars).

Variation, in music, is the technique of adding to or changing some element of a composition. The technique is often called *theme and variations.* A composer takes a theme—his or her own or that of another composer—and writes a set of variations on that theme.

The number of variations that can be written on a theme is limited only by the composer's imagination. The main types are *melodic variation* and *harmonic variation.* In melodic variation, the melody is altered but remains recognizable. For example, it may be speeded up or slowed down, or played in different metres. In harmonic variation, the composer may completely change the melody, but the basic harmony is preserved.

Spanish and English composers originated the theme and variations form in the 1500's. Since that time, most composers have used the form, either for independent pieces or as sections of sonatas, symphonies, and other large-scale instrumental works.

Varicella. See **Chicken pox.**

Varicose vein is a swollen vein caused by some body condition that interferes with the flow of blood toward the heart. Veins in the legs often become varicose, especially when a person stands a great deal. Heart and liver diseases, gout, pregnancy, and abdominal tumours are among the various other causes of varicose veins.

In advanced cases of varicose veins, bluish knotty lumps form along the vein. The patient feels considerable pain in the leg. The chief dangers are that blood will clot in the vein or that the vein will burst, and cause haemorrhage. The diseased veins can also keep the tissues from getting enough nourishment. Water may collect under the skin and cause swelling and ulcers.

Doctors recommend wearing an elastic stocking or bandage, which will support the varicose vein with steady pressure. Doctors often inject the veins with drugs that tend to shrink them or they may remove the veins by surgery. A disorder known as *haemorrhoids* is varicose veins of the rectum. See **Haemorrhoids.**

Varnish is a transparent liquid used to protect wood, metal, and other materials from air and moisture, and to improve their appearance. A varnish leaves a hard, glossy film when it dries.

Clear varnishes protect the surface of wood while allowing the natural grain of the wood to show through. *Varnish stains* contain dyes that change the colour of the wood but still bring out the grain. Varnishes used on metal are sometimes called lacquers. Lacquers help prevent corrosion without dulling the metallic appearance. Varnishes are also used to protect insulating wires, masonry, and paper from moisture.

Varnishes can be baked on by heating the varnished articles in ovens at temperatures of 66° to 200° C. Baking improves the wearing quality of the varnished object.

Types of varnish. There are two main classes of varnishes, spirit and oleoresinous. *Spirit varnishes* are made of chemicals called *resins.* The resins are dissolved in a quickly-evaporating solvent such as alcohol. These varnishes dry when the solvent evaporates. Shellac is a common spirit varnish. Other spirit varnishes include Japan, dammar, and pyroxylin lacquers.

Oleoresinous varnishes are mixtures of resins and drying oils that are heated and dissolved in turpentine or petroleum products. These varnishes dry in two ways, by evaporation of the solvent, and by the hardening of the resin-oil mixture when it combines with oxygen. Oleoresinous varnishes withstand outdoor conditions well. Spar varnish, used on the wood exterior of boats, is an oleoresinous varnish.

Making varnish. Both natural resins and synthetic resins are used in making varnish. *Natural resins* are extracted from living plants and from fossil plants. Shellac, dammar, and rosin are common natural resins. *Synthetic resins* include such chemical compounds as phenol-formaldehyde, urea-formaldehyde, alkyd (glyceryl phthalate), and cumar.

In making spirit varnishes, the resin is dissolved by churning it with the solvent. Small amounts of heat are sometimes used to speed the dissolving process. After the resin is dissolved, the varnish is refined by filtering and is then ready for use.

In making oleoresinous varnishes, the oil and resin are cooked in closed kettles that hold 19,000 litres or more. The mixture is kept at a temperature of 230° to 370° C until it reaches the desired *body* (thickness). Then the mixture is cooled and thinners are added. Some natural resins will not dissolve easily in oils. These resins are *run* (heated at about 320° C, until 15 to 30 per cent evaporates).

Drying oils are added to the varnish to hasten the drying time. Linseed oil was probably the first oil to be used in varnishes. Many other drying oils such as perilla, tung, dehydrated castor, soybean, and fish oils are used today. Compounds of lead, cobalt, or manganese are often added to quicken drying.

Varnishes can be described in terms of the ratio of oil to resin, which is known as their *oil length.* There are three main types of oil length. Short oil length uses 1 to 1.5 parts of oil to 1 part of resin; medium oil length uses 1.5 to 3 parts of oil to 1 part of resin; and long oil length uses 3 to 6 parts of oil to 1 part of resin. Varnishes used on surfaces exposed to weather have a longer oil length than those used indoors.

See also **Lacquer; Shellac; Resin; Airbrush.**

Vasco Da Gama. See **Da Gama, Vasco.**

Vase is a general term for a decorative or ornamental hollow vessel that is usually used to hold flowers. The term is generally limited to vessels that are deeper than they are wide. However, vases have been produced in a variety of shapes and sizes, including cylinders, spheres, pear shapes, and egg shapes.

Vases are commonly made from clay as pottery or porcelain. But such materials as glass, plastic, stone, and metal are also frequently used. A vase may be decorated in many ways, depending on the material from which the vase is made, the time and style in which the vase was produced, and the person who decorated it.

Some vaselike vessels are made for purposes other than holding flowers. Such vessels are commonly referred to by other names. For example, large vaselike vessels are usually called urns. Ancient people such as the Greeks used urns for domestic and ceremonial purposes, including holding the ashes of cremated bodies. Today, urns still serve this purpose but are also used as ornaments.

For illustrations of vases, see **Art nouveau; China** (Arts); **Flower** (Flower arranging); **Furies; Islamic art; Ming dynasty; Painting** (Greek painting); **Porcelain; Pottery; Rococo; Wedgwood ware.**

Vasectomy. See **Surgery** (table).

Vaseline. See **Petrolatum.**

Vasodilator nerves. See **Blushing.**

Vásquez de Coronado, Francisco. See **Coronado, Francisco Vásquez de.**

Vassal. See **Feudalism.**

Vatican City (pop. 1,000) is the smallest independent state in the world. It serves as the spiritual and governmental centre of the Roman Catholic Church, the largest Christian church in the world. Vatican City covers only 44 hectares. But it exercises spiritual sway over millions of Roman Catholics. Its ruler is the pope. Vatican City lies entirely within the city of Rome, Italy. But it is foreign soil to Italian citizens. Vatican City has been an independent sovereign state since the signing of the Treaty of the Lateran in 1929. For location, see **Italy** (political map); **Rome** (map: Central Rome).

The official name of Vatican City in Italian is Stato della Città del Vaticano (The State of Vatican City). *The Vatican* is a short name for the state and for the city that makes up the state. People often use the term *Vatican* to refer to the pope and the government of Vatican City, in much the same way as they use the terms *Washington* or *London* to refer to the United States or British governments.

Description

Vatican City is about as large as an average city park. It lies on Vatican Hill in northwestern Rome, just west of the Tiber River. High stone walls surround most of the city. The irregularly shaped area within these walls contains picturesque buildings in several architectural styles. It also contains many courtyards, landscaped gardens, and quiet streets. The huge St. Peter's Church, with its stately dome, dominates the entire city.

St. Peter's Church is one of the largest Christian churches in the world. Contrary to popular belief, it is a basilica, not a cathedral. A basilica is a church that is given certain ceremonial privileges by a pope. A cathedral serves as the principal church of a bishop's diocese and contains his official throne. The pope is the bishop of Rome and his cathedral church is St. John Lateran (see **Lateran**). For a history and description of St. Peter's Church and St. Peter's Square, see **Saint Peter's Church.**

Vatican Palace is a group of connected buildings with well over 1,000 rooms. The various chapels, apartments, museums, and other rooms cluster around several open courts. The pope's apartment, the offices of the Secretariat of State, and reception rooms and halls occupy one part of the palace. The remainder is devoted largely to the Vatican Museums, the Vatican Archive, and the Vatican Library.

Vatican Museums have a priceless collection of statuary, including the famous *Apollo Belvedere* and the *Laocoön* (see the pictures in the articles on **Apollo** and **Laocoön**). The museums also have large sections devoted to pagan and Christian inscriptions, to Egyptian and Etruscan antiquities, and to modern religious art. The many rooms and chapels within the museums are decorated by the works of such master artists as Fra Angelico, Pinturiccio, Raphael, Titian, and Leonardo da Vinci. Some of Michelangelo's greatest paintings decorate the ceiling and one large wall of the Sistine Chapel (see **Michelangelo; Sistine Chapel**).

Vatican Archive contains important religious and historical documents. Pope Paul V organized the archive in 1612. It houses such important documents as the original report on the trial of Galileo (1633), the request of the English Parliament for the annulment of the marriage of Henry VIII to Catherine of Aragon (1530), and the concordat of Napoleon (1801). Pope Leo XIII opened the archive to scholars in 1881. Since then, many European nations have created historical institutes to search the archives for information on their particular countries.

Vatican Library has one of the world's largest and most valuable collections of early manuscripts and books. See **Vatican Library.**

Other buildings belonging to Vatican City but located outside the city walls include the basilicas of St. John Lateran, St. Paul's-outside-the-Walls, and St. Mary Major, all in Rome; and the pope's summer villa and the Vatican observatory at Castel Gandolfo.

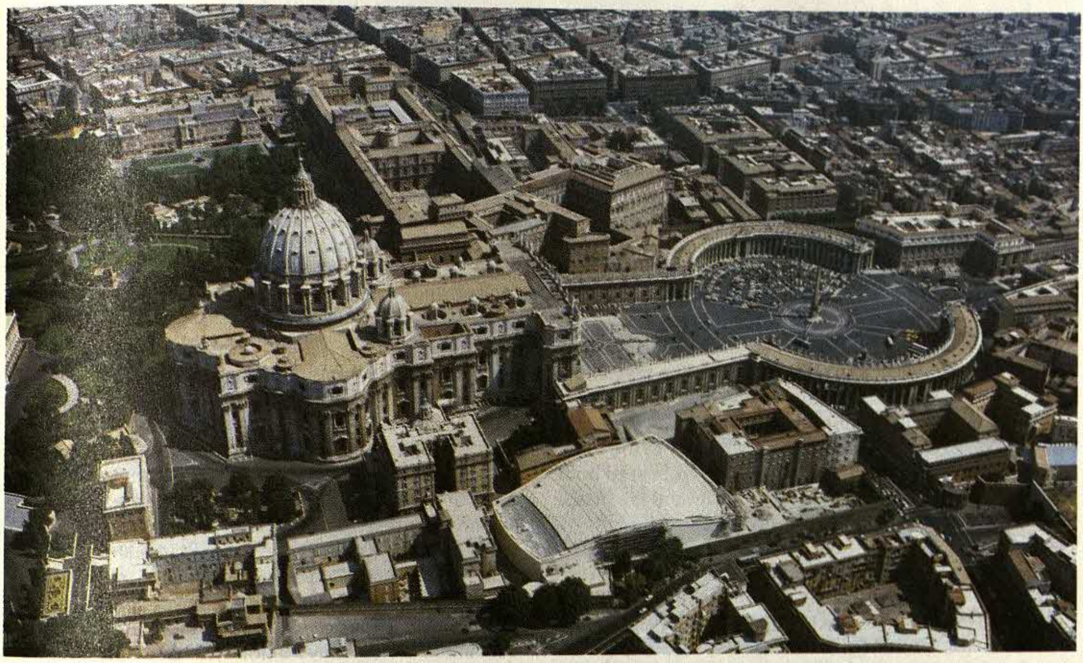
Administration

The pope, as absolute ruler of Vatican City, heads all government branches. But, since he devotes his time primarily to spiritual and ecclesiastical matters, he delegates most of his temporal authority to other officials.

The internal domestic affairs of Vatican City are directed by a governor, whose duties resemble those of the mayor of a city. Foreign affairs are handled by the cardinal secretary of state, who also coordinates ecclesiastical and political affairs. The Vatican has civil law courts in addition to the Tribunal of the Sacred Roman Rota, which handles religious cases. But most civil criminal cases are prosecuted by the Italian government. The office of the master of papal ceremonies directs all ceremonies in which the pope takes part. The Prefecture of the Papal Household arranges audiences with the pope and also handles matters of protocol and etiquette. Vatican finances are controlled by a number of administrations, or departments. Each administration handles a different set of funds.

Vatican City issues its own postage stamps, coins, and licence plates. The pope's yellow-and-white banner is the official state flag (see **Flag** [picture: Flags of Europe]).

Public works. The Vatican maintains its own postal system, telephone and telegraph systems, water supply, and lighting and street-cleaning services. It also has its own bank, a large printing plant, and a rarely occupied



Vatican City covers an area of only 44 hectares in northwestern Rome. This picture shows a portion of the gardens to the left of St. Peter's Church, with its famous dome. St. Peter's Square extends from the church entrance to the right.

jail. Although the state has its own railway station, no one has ever bought a ticket to Vatican City. The 270 metres of track that connect the station in Vatican City with an Italian railway carries only freight.

Armed forces. Vatican City does not have an army or navy capable of fighting a war. The Vatican does, however, maintain a military corps known as the Swiss Guard. The function of the Swiss Guard is to maintain a constant watch over the pope and his personal residence (see **Swiss Guard**). In addition, the Central Office of Vigilance guards Vatican City. Also, the St. Peter and Paul Association provides everyday police services.

Diplomatic corps of Vatican City includes about 90 *legates* (ambassadors), as well as other diplomatic personnel. Papal legates who head the Vatican's delegations to other countries are called *nuncios* and *pro-nuncios.* Nuncios and pro-nuncios also serve as the representative to the Roman Catholic Church in those countries. Countries with large Roman Catholic population majorities and strong Roman Catholic traditions, such as Ireland, the Philippines, and Spain, receive nuncios from the Vatican. Pro-nuncios represent the Vatican in many other countries, including Australia, Indonesia, the United Kingdom, and the United States. Papal representatives in countries that have no formal diplomatic relations with the Vatican are called apostolic delegates.

Communications. The Vatican publishes *L'Osservatore Romano,* one of the most influential daily newspapers in the world. Other Vatican publications include the weekly *Osservatore della Domenica;* and the *Acta Apostolicae Sedis,* which prints official church documents. The Vatican's radio transmitter broadcasts news and papal messages in 30 languages, including Latin.

History

Vatican Hill was once the site of Roman emperor Nero's public gardens and circus. According to tradition, St. Peter was crucified on the hill and buried nearby. The early popes believed that a shrine built in the A.D. 100's marked the site of Peter's tomb. Because of this belief, they erected Vatican City on that spot.

In the A.D. 300's, the Christian emperor Constantine the Great built a basilica over the tomb in which St. Peter was believed to be buried. The Vatican Palace and other structures were gradually built around the basilica. But the main residence of the popes during the Middle Ages was the Lateran Palace in Rome, not the Vatican. From 1309 to 1377, the popes lived at Avignon, France. On their return to Rome, they found the Lateran Palace burned, so they moved to the Vatican. Beginning in the 1500's, St. Peter's Church was built on the site of the Old Basilica of Constantine.

Over the years, the popes gained control over an area in central Italy called the Papal States. In 1870, after a series of political defeats, Pope Pius IX lost his power over the Papal States. In protest, he and his successors withdrew inside the Vatican and refused to deal with the Italian government. In 1929, the Treaty of the Lateran was signed. This treaty led to the establishment of the independent State of Vatican City. For the provisions of this treaty, see **Papal States.**

In 1939, Pope Pius XII initiated a series of excavations beneath St. Peter's Church. These excavations unearthed, among other things, a tomb thought to be the original tomb of St. Peter.

See also **Pope; Roman Catholic Church.**

Vatican Council I was the 20th *ecumenical* (general) council of the Roman Catholic Church. Pope Pius IX summoned the council, which met in Rome from December 1869 to September 1870. It was the first ecumenical council since the end of the Council of Trent in 1563.

Vatican I took a stand against many of the *secular* (nonreligious) trends of the age. It promoted a centralized church extending beyond national boundaries with supreme authority residing in the pope. The council proclaimed the *infallibility* of the pope's teaching authority in the constitution *Pastor Aeternus (The Eternal Shepherd).* The constitution stated that the pope cannot commit error when he speaks as head of the church to define solemnly, in matters of faith and morals, what is to be accepted by all Roman Catholics as the revelation coming from Jesus Christ and His apostles.

The council ended after the new Kingdom of Italy annexed Rome, causing the pope to withdraw to the Vatican Palace. Thus, the period of Vatican I witnessed both the peak of the pope's religious authority and the disappearance of his civil power. See **Pius IX.**

Vatican Council II was the 21st *ecumenical* (general) council of the Roman Catholic Church. Pope John XXIII called the council, which met in four sessions in Rome. The first session ran from Oct. 11 to Dec. 8, 1962; the second session from Sept. 29 to Dec. 4, 1963; the third session from Sept. 14 to Nov. 21, 1964; and the final session from Sept. 14 to Dec. 8, 1965. Vatican Council II was the first ecumenical council held by the church since the suspension of Vatican Council I in 1870.

Background. John XXIII was elected pope in 1958 at the age of 76. On Jan. 25, 1959—less than three months after his election—John surprised the world by announcing his intention to summon an ecumenical council of the Catholic Church. After three years of preparation, the council opened on Oct. 12, 1962, with about 2,500 participants and many non-Catholic observers. It was the largest church council in history.

In his opening statement to the council, John expressed his hope that the council's work might promote the unity of Christianity and of all humanity. The pope summed up his aims for the council in the Italian term *aggiornamento,* which came to mean a renewal or updating of Catholic life and teaching.

The work of the council. Commissions directed by the Roman Curia, the pope's administrative arm, prepared draft documents on a variety of subjects for council consideration. However, many bishops in the council found the drafts insufficiently pastoral and too conservative in tone. The council rejected these drafts and began, with the support of the pope, to chart its own course, which led to many progressive and reforming actions.

John XXIII died on June 3, 1963, and Paul VI was elected the next pope. Paul had been a leading progressive in the first session of the council. He reconvened the council and guided it to its conclusion.

Vatican Council II issued 16 documents—four *constitutions,* three *declarations,* and nine *decrees.* The most important were the constitutions, which dealt with the liturgy, divine revelation, the church, and the church in the modern world.

The Constitution on the Liturgy (called *Sacrosanctum Concilium* in Latin) started a number of reforms. The constitution led to the celebration of the Mass in the *vernacular*—a congregation's native language—instead of in the traditional Latin. This constitution was one of the council's most far-reaching accomplishments. It brought the central act of Catholic worship closer to the people and made it clear that the celebration was one in which the entire Catholic community played a part.

The Constitution of Divine Revelation (Dei Verbum) restored the Bible to a central place in Catholic thought and practice. It insisted that the church's teaching authority must always be submissive to the Word of God. The constitution stressed that revelation itself is not found primarily in verbal statements, but in the person of Jesus Christ who is the fullness of revelation. However, the whole community, under the leadership of its bishops, lives out the revelation it has received and transmits it from generation to generation. For centuries, Catholic theologians had treated revelation in a philosophical and abstract fashion. In contrast, Vatican Council II adopted a more Biblical language and perspective. It presented revelation as the concrete personal encounter of men and women in history with the living God who calls them to salvation.

The Dogmatic Constitution on the Church (Lumen Gentium) described the church as the visible sign or sacrament of humanity's union with God and with one another. This constitution's favourite image of the church was that of "the people of God." By emphasizing this image, the council underscored the church's presence and involvement in human history. It also emphasized its intimate spiritual ties with the people of Israel. This focus on the church as the whole people of God enabled the council to break with the one-sided emphasis of preceding centuries on the power of the clergy. The constitution gave lay people specific responsibilities and rights within the church.

One feature of this constitution was its teaching on the "collegiality of bishops." According to the document, the bishops and the pope form one body. This teaching complemented Vatican Council I's teaching on papal primacy and infallibility (see **Vatican Council I**). It also supported the view of the church as a communion of local churches with the pope as its head. The constitution thus returned to the bishops some of the authority that the papacy had absorbed over the centuries.

The Pastoral Constitution on the Church in the Modern World (Gaudium et Spes) promoted a dialogue between the Catholic Church and the modern world. Since the French Revolution (1789-1799), much of the church opposed modern attitudes in non-Catholic society, some of which were considered hostile to Christianity. The constitution recognized that the church exists in the world and must proclaim its message in terms the world can understand. The constitution also acknowledged that the church has much to learn from the authentic values of modern life.

The constitution was a unique product of the council. It altered the isolation from the non-Catholic world that had characterized previous church councils. In the document, John's aggiornamento found practical expression in establishing a new relationship with non-Catholics.

Other documents. In addition to the four major constitutions, the council issued two especially notable declarations. One, called *Declaration on the Relation of the*

Church to non-Christian Religions (*Nostra Aetate*), celebrated the special spiritual ties binding Christians and Jews. It denounced all forms of anti-Semitism and laid the basis for a new understanding and respect between Christians and Jews. The *Declaration on Religious Liberty* (*Dignitatis Humanae*) broke with the abstract proposition that "error has no rights." Instead, it stressed that individual conscience demands respect, especially in matters of religious faith and observance.

The influence of the council. Vatican Council II started the most far-reaching reforms within the Catholic church in 1,000 years. Probably few participants in the council fully realized the magnitude of the changes they had set in motion. The council helped transform the church from a European-centred institution toward a more genuinely world church, with most of its followers living in Third World countries outside Europe and North America.

These striking transformations also created tensions. From the beginning of the council, there were conflicts between conservative and progressive views. Some Catholics believed the council actions resulted in too much change. They opposed Catholic reformers who wanted to vigorously update worship, doctrine, and the church's view of its place in the world. As one legacy of the council, Catholics have tried to emphasize the importance of the local or regional church united around its own bishop. At the same time, they have acknowledged the universal authority of the pope. They have also attempted to affirm a common faith while encouraging different cultural expressions of that faith.

See also **Roman Catholic Church** (The church today; picture); **Religious life** (The Roman Catholic Church).

Vatican Library is the library of the Roman Catholic Church in Vatican City. It has one of the world's most important collections of early manuscripts and books. Nicholas V, pope from 1447 to 1455, founded the library as a library for handwritten manuscripts.

The Vatican Library is still chiefly a manuscript library, though it now also has about one million printed books in its collection. The library's manuscripts number more than 70,000, over 31,000 of which are valuable old Latin works. There are also nearly 4,000 Greek and Oriental manuscripts in the library. The library's collections are open to scholars.

See also **Library** (picture: Vatican Library).

Vaudeville is a kind of theatrical entertainment that features a wide variety of acts. It was the most popular form of entertainment in the United States from the 1880's to the early 1930's. Vaudeville developed many stars who later gained great success in other types of entertainment, especially films and radio. These stars included Jack Benny, George Burns, Eddie Cantor, W. C. Fields, Al Jolson, Ed Wynn, and Sophie Tucker.

Some vaudeville theatres presented 20 or more acts in a single *bill* (performance). But the standard pattern was 8 to 10 acts. The range of material and performers was enormous. A vaudeville show presented jugglers, animal acts, skits, recitations, celebrities of the day, singers, and, most popular of all, comics and magicians. The arrangement of the acts might have seemed unplanned. But theatre managers carefully organized their bills to present a selection of dissimilar acts intended to create excitement and expectation among the audience.

Because of the efforts of powerful producers and theatre owners, vaudeville became a highly organized nationwide big business. A number of individuals controlled large *circuits* (chains) of theatres. The best known of these circuits were operated by E. F. Albee, Martin Beck, Willie Hammerstein, B. F. Keith, Marcus Loew, William Morris, Alexander Pantages, and F. F. Proctor. All vaudeville performers wanted to star in "big-time" theatres that presented only two shows a day. But most appeared in "small-time" theatres that offered 3 to 12 shows a day. Some theatres presented shows that began about 9:30 a.m. and lasted until about 10:30 p.m.

The term *vaudeville* comes from a French word for a light play with music that was popular in France during the 1800's. The American form grew out of attempts by saloon owners to attract more customers by offering free shows. These shows were known as *variety.* At first, variety had a bad reputation because it took place in saloons and often included vulgar material. But by the 1890's, it had achieved respectability under the more elegant French name of *vaudeville.* Soon vaudeville had become the major form of live entertainment for family audiences. Showman Tony Pastor is credited with converting vaudeville into family entertainment by prohibiting drinks and upgrading the quality of the performers. He presented many famous vaudeville stars at Tony Pastor's Opera House in New York City.

Vaudeville's popularity declined with the development of talking films in the late 1920's. But vaudeville-style acts are still presented in some night clubs and on television.

See also **Music hall.**

Vaughan, Henry (1622-1695), a Welsh-born poet, was one of the leading poets of the 1600's. His poetic career began with *Poems* (1646), a volume of imitative, nonreligious verse. After a religious conversion prompted by his reading of poet George Herbert and the death of a brother, Vaughan wrote *Silex Scintillans* (two parts, 1650 and 1655). With this Latin title ("the flashing flint"), Vaughan renounced flashy "poetical wit" and referred to the way God's love can strike fire into even the stoniest human heart. He described such moments of spiritual illumination with striking imagery derived from nature and the thought of the Greek philosopher Plato. Vaughan's great poem "The World" is a complex meditation on how he "saw Eternity the other night,/ Like a great ring of pure and endless light."

Vaughan was born in Wales and studied in England. In 1642, he returned to Wales, where he lived out his life as a country doctor.

See also **Herbert, George; Metaphysical poets.**

Vaughan Williams, Ralph (1872-1958), was one of Great Britain's foremost composers. His music mingles the flavours of English folk songs and Tudor church music, both of which he studied intensively. He produced such distinguished music as the *Sixth Symphony* (1947); an opera, *The Pilgrim's Progress* (1951); *Seventh Symphony,* or *Sinfonia Antarctica* (1952); and *Eighth Symphony* (1956). He composed music for the coronation of Queen Elizabeth II in 1953.

Vaughan Williams was born in Down Ampney, Gloucestershire, England. He believed that modern English classical music should draw on England's folk-song tradition and on English musical styles of the late 1500's and early 1600's. In 1904, Vaughan Williams became active in the Folk Song Society, and edited *The English Hymnal* in 1905. By 1914, he had written *A Sea Symphony* (1910), *A London Symphony* (1914), and several other choral and orchestral works. His other popular works include *Fantasia on a Theme by Thomas Tallis* (1919), *The Lark Ascending* (1921), *Sir John in Love* (1929), and *Fantasia on Greensleeves* (1934).

Vault is an arched roof or ceiling. Vaults are most commonly made of brick, concrete, or stone. The four main kinds of vaults are (1) the barrel vault, (2) the groined vault, (3) the ribbed vault, and (4) the dome.

The barrel vault, the simplest type, is a single continuous unbroken arch in the form of a tunnel. The groined vault is formed by joining two barrel vaults of the same shape at right angles. The lines at which the two vaults meet are called *groins*. In the ribbed vault, projecting ribs cover the groins, or are placed in decorative patterns elsewhere on the vault's surface. The dome is a vault in the form of a *hemisphere* (half sphere).

The word *vault* also applies to rooms with heavy doors and walls designed for the safekeeping of valuables. In cemeteries, enclosures or buildings called vaults are used as places of burial.

See also **Architecture** (table; pictures: A vault; Gothic cathedrals); **Dome; Rome, Ancient** (Arts and sciences).

The dome vault, *above,* in the Tower of London is made of stone. Such vaulted ceilings are a feature of Gothic architecture.

VCR. See **Videotape recorder.**

VD. See **Sexually transmitted disease.**

Veal is the flesh of a *calf* (young cow or bull) used for food. In many European countries, veal is highly prized for its texture and light colour.

Veal calves, known in some countries as *vealers,* are bred by intensive factory farming techniques. The calves are taken from their mothers a few days after birth and kept in a controlled environment until they are killed. In some countries, the calves are placed in veal crates, in which they are kept in the dark and in a confined space and fed an iron-deficient milk substitute. This diet helps keep their meat light and tender. Such treatment has drawn angry criticism from animal welfare groups, and some governments have banned the use of veal crates. Veal calves are usually slaughtered after 12 weeks.

Physically and chemically, veal is like beef. But beef is called red meat whereas veal is called white. The finest veal varies in colour between light pink and light grey. Veal contains more water than beef but has less connective tissue and little fat. Veal is more tender than beef but has less flavour.

See also **Beef; Cattle** (Beef cattle); **Meat.**

Veblen, Thorstein Bunde (1857-1929), was an American economist. His first book, *The Theory of the Leisure Class* (1899), is a scholarly and satirical protest against the false values and social waste of the upper classes. *The Theory of Business Enterprise* (1904) criticizes the capitalist system. In *The Engineers and the Price System* (1921), Veblen assigned to scientists and engineers an important position in building a new planned economic society. Veblen was born in Cato, Wisconsin.

Vecellio, Tiziano. See **Titian.**

Vector. See **Force** (Calculating resultant force).

Vedas are the oldest sacred books of Hinduism. The Vedas include the basis of the doctrines concerning Hindu divinities. They also present philosophical ideas about the nature of Brahman, the supreme divine being of the Hindu religion. The word *veda* means *knowledge.*

There are four Vedas. They are, in order of age beginning with the oldest, *Rig-Veda, Sama-Veda, Yajur-Veda,* and the *Atharva-Veda.* Each Veda is divided into four parts: (1) the *Samhitas,* consisting of hymns and prayers written in verse; (2) the *Brahmanas,* dealing mainly with ideas about Brahman and with religious ceremonies; (3) the *Aranyakas,* derived from meditation in the forest; and (4) the *Upanishads,* philosophical works.

The Vedas were composed during the 1,000 years before the birth of Christ. For hundreds of years, certain Hindu families memorized parts of the Vedas and passed them down orally. Hindu law permitted only certain people to hear the Vedas recited, and so the works became surrounded by mystery. Nevertheless, the ideas presented in the Vedas spread throughout Indian culture. The Vedas were probably first put in writing about the time of Christ's birth.

See also **Brahman; Hinduism; Sanskrit language and literature; Upanishads.**

Vega is the brightest star in Lyra, a constellation in the Northern Hemisphere. It is also called *Alpha Lyrae.* Vega appears bluish-white because it is extremely hot. The star's surface temperature is about 10,000° C. Vega is about 26 light-years from the earth (see **Light-year**).

In 1983, the Infrared Astronomical Satellite (IRAS), an observatory orbiting the earth, detected a giant ring or shell of solid particles surrounding Vega. These particles probably grew from the remains of the cloud of gases and dust that formed the star. Many astronomers believe the material around Vega might be a solar system in the making.

See also **Astronomy** (map: The stars and constellations of the Northern Hemisphere); **North Star.**

Vega, Lope de (1562-1635), was the most important playwright of Spain's Golden Age. He wrote more plays than any other author. Lope was once credited with 1,800 full-length plays and 400 *autos sacramentales* (short religious plays). This total is an exaggeration, but scholars generally agree that he wrote over 400 plays. The two largest categories are "cloak-and-sword" plays of intrigue, and historical plays, such as *The Best Mayor, the King* (1616?) and *Fuenteovejuna* (1619?).

Lope described his theory of drama in *The New Art of Writing Plays* (1609). He rejected the dramatic unities that restricted action to a single place during a specific length of time. He believed that the best themes were conflicts of passion and the Spanish honour code. His characters usually lack individuality, but his style is poetic and his situations are exciting. Lope's influence on the dramatists of his time was strong, and he is credited with creating a Spanish national drama.

Lope Félix de Vega Carpio was born in Madrid. He led an adventurous but troubled life, as several of his love affairs ended sadly. Lope became a priest in 1614.

See also **Drama** (The Golden Age of Spanish drama); **Spanish literature** (The 1600's).

Vegetable is any of many nutritious foods that come from the leaves, roots, seeds, stems, and other parts of certain plants. People eat vegetables raw or cooked and use them as part of a main meal, in salads and soups, and as snacks. Apart from locally grown vegetables and herbs eaten in tropical countries, there are about 100 kinds of vegetables in common use or cultivation around the world.

Vegetables are an important part of a healthy diet. They are excellent sources of vitamins, especially niacin, riboflavin, thiamine, and vitamins A and C. Vegetables also supply the minerals calcium and iron. Most vegetables do not have many calories.

The growing of vegetables is a branch of *horticulture,* a field of agriculture that also includes the growing of fruit. Scientists define a vegetable as the edible product of a *herbaceous plant.* A herbaceous plant has stems that are softer and less fibrous than the woody stems of trees and shrubs. Most vegetables are *annuals*—plants that live for only one year or one growing season.

The horticultural definition of vegetables distinguishes them from fruit, which grow annually on trees and other woody plants that live more than two years. In some cases, common usage differs from scientific definitions. For example, most people consider watermelons as fruit. But horticulturists regard them as vegetables because the melons grow on vines that must be replanted annually. And horticulturalists classify tomatoes as fruit. But most people consider tomatoes vegetables because fresh tomatoes are used in much the same way as lettuce, onions, and other vegetables.

The hobby of growing a home vegetable garden can help reduce food costs, produce high-quality vegetables, and provide exercise and fun. The most popular vegetables grown in home gardens include beans, cabbage, courgettes, cucumbers, lettuce, onions, radishes, and tomatoes. This article deals mainly with the commercial production of vegetables. For more information on home vegetable growing, see **Gardening.**

Many vegetables grown commercially in industrial countries are tinned, dehydrated, frozen, or processed in some other way. Vegetables that are often grown for processing include peas, potatoes, green beans, and sweet corn. Almost any vegetable, however, can be processed commercially and sold in tins or jars. China grows far more vegetables than any other country.

Plant parts used as vegetables

Vegetables can be grouped according to the part of the plant from which they come. Plant parts eaten as vegetables include bulbs, flower clusters, fruits, leaves, roots, seeds, stems, and tubers.

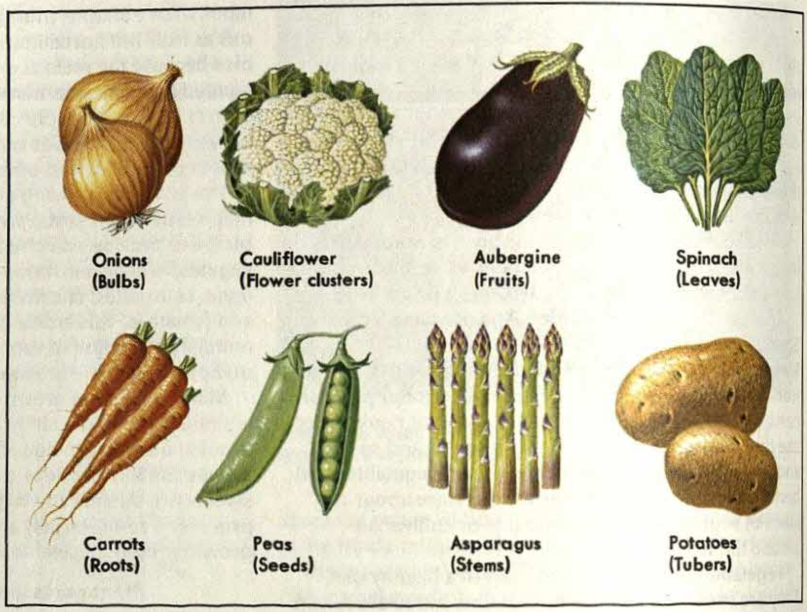
Bulbs consist of many fleshy leaves that surround a short stem. The base of these leaves is large and grows underground, and it is the part usually eaten. Garlic, leeks, onions, and shallots are bulbs used as vegetables and seasonings.

Flower clusters. The most common flower clusters used as vegetables are broccoli and cauliflower. Broccoli plants have *heads* (thick clusters of flower buds) that are green and branched. The heads of cauliflower are tight, round, and white.

Vegetables are an important part of a healthy diet. They provide valuable vitamins and minerals, particularly when eaten uncooked. Fresh, locally produced vegetables are sold at the traditional "floating market" at Bangkok, Thailand, *left.*

Plant parts used as vegetables

Vegetables are nutritious foods that come from various parts of certain kinds of plants. Bulbs, flower clusters, fruits, leaves, roots, seeds, stems, and tubers may be eaten as vegetables.



Fruits are the seed enclosures, along with the seeds, produced by a flowering plant. Horticulturists consider the edible fruits of herbaceous annuals as vegetables. Fruits of vegetable plants include aubergines, cucumbers, gourds, muskmelons, okra, peppers, pumpkins, green beans, tomatoes, and watermelons.

Leaves eaten as vegetables include Brussels sprouts, cabbage, chard, Chinese cabbage, cress, endive, kale, lettuce, mustard, and spinach. Some of the vegetables are cooked, but most are eaten raw in salads. Celery and rhubarb are *petioles* (leafstalks). Petioles support the leaf blades and are connected to the stems of a plant.

Roots that are vegetables may be *fibrous roots* or *taproots.* Fibrous roots branch and spread sideways underground. Sweet potatoes are enlarged, fleshy parts of fibrous roots. A taproot is the enlarged part of a root that grows straight down. Beetroots, carrots, horseradish, parsnips, radishes, swedes, and turnips are all examples of taproots.

Seeds. People eat the seeds of plants when they eat cowpeas, garden peas, kidney beans, lima beans, navy beans, and sweet corn. Certain seeds, such as kidney beans and navy beans, are harvested after they become hard. Other seeds, such as garden peas and sweet corn, are picked when they are still soft.

Stems support the leaves, flowers, and fruits of a plant. The two chief stems eaten as vegetables are asparagus and kohlrabi. Asparagus stems are tall and slender. Kohlrabi plants have large bulblike stems.

Tubers. Most tubers are a specialized kind of stem that grows underground. The main ones used as vegetables are potatoes and Jerusalem artichokes. People in many Western countries, notably Ireland, the United Kingdom, the United States, and Canada eat more potatoes than any other vegetable.

Growing vegetables

The choice of a location for raising any vegetable commercially depends chiefly on the climate. For example, sweet corn grows best where the summers are wet. Potatoes thrive in cool growing conditions. Hot countries and irrigated desert areas are ideal for raising tomatoes. Cool summers are just right for lettuce.

There are four basic steps in commercial vegetable production: (1) planting, (2) caring for the crop, (3) harvesting, and (4) packing and shipping. Many vegetable growers use various kinds of machines for these operations.

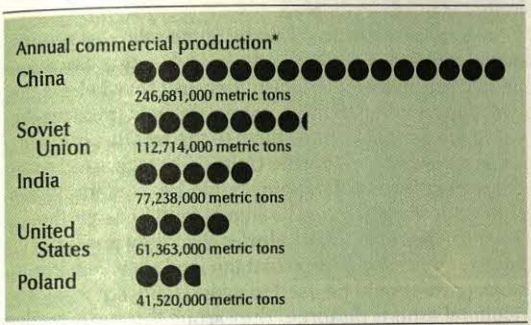
Planting. Many vegetables are planted as seeds in the field where they will grow until harvested. This method is called *direct seeding.* Some vegetable farmers plant *pregerminated seeds.* These seeds are first sprouted in partly decayed plant matter called *peat.* The mixture of peat and sprouted seeds is then planted in the field. Some vegetables, such as cabbage and tomatoes, may be grown from transplanted seedlings that were started in a greenhouse or in a field in a warmer climate. A vegetable grower can produce a crop earlier in the season by using transplants than would be possible by direct seeding.

The planting date varies with the type of vegetable. Some vegetables grow best in cool weather and are planted early in spring. They include beetroots, carrots, lettuce, potatoes, radishes, and spinach. Others, such as cabbage, onions, and peas, can withstand frost and are planted even earlier. Growers in warm countries can plant cool-weather vegetables during winter. In cold countries, warm-season vegetables can be planted in late spring.

Some vegetables, among them aubergines, courgettes, and sweet corn, require warm weather. These crops are planted so that the seedlings emerge after the last frost of the season. Cucumbers, lima beans, muskmelons, and tomatoes are planted only after the final frost.

Tropical vegetables cannot normally grow outdoors in temperate climates. But many temperate vegetables may grow well in the tropics, especially at high altitudes. Some tropical vegetables, such as capsicum (peppers)

Leading vegetable-growing countries



*Does not include soybeans. Soybeans are classified as a vegetable, but are used mainly to make oil and animal feed.
Figures are for 1985. Source: Food and Agriculture Organization of the United Nations.

and aubergines, grow well in subtropical regions. These vegetables are popular in Spain and other Mediterranean countries.

Caring for the crop begins by preparing the soil before the seeds are planted. The vegetable grower cultivates and fertilizes the fields and also may apply weedkiller. After planting the crop, the grower may cultivate the fields again to kill weeds and improve the circulation of air and water through the soil. More fertilizer may also be applied.

Vegetable farmers inspect their crops periodically for destructive insects and plant diseases. Farmers use a variety of chemicals and methods of control because different insects and diseases attack different plants. Fields of vegetables may have to be irrigated if they do not receive enough rain. In areas with arid and semiarid climates, irrigation is a necessity.

Harvesting vegetables at the proper time is extremely important. Vegetables sent directly to a local market or to a processing plant can be more mature when harvested than those that must be shipped long distances. Farmers may harvest some vegetables, such as carrots and potatoes, over a period of several weeks. However, other crops must be picked and transported rapidly to ensure freshness and quality.

Packing and shipping. Vegetables are graded according to quality and size. Harvested vegetables may be taken to a building where they are sorted, washed, trimmed, packaged, and labelled. But some machines can pick, sort, and package the crops while moving through the fields.

Most vegetables are washed to remove dirt and prevent wilting. The outer leaves of lettuce and cabbage are removed to improve the appearance of the vegetables. Cucumbers may be waxed to prevent water loss. Some vegetables, including lettuce and sweet corn, must be cooled to prevent spoilage after being harvested.

Vegetables are shipped by refrigerated trucks or railway freight cars to local or distant markets and processing plants. Some vegetables, such as onions and potatoes, can be stored for long periods before being shipped.

Related articles in *World Book.* See the *Agriculture* section of the various country articles for a discussion of vegetables grown there, such as **Australia** (Agriculture). Additional related articles include:

Vegetables

Artichoke
Asparagus
Aubergine
Bean
Beet
Broccoli
Brussels sprouts
Cabbage
Capsicum
Carrot
Cauliflower
Celery
Chayote
Chinese cabbage
Chive
Collards
Cowpea
Cress
Courgette
Cucumber
Endive
Garlic
Horseradish
Jerusalem artichoke
Kale
Kohlrabi
Leek
Lentil
Lettuce
Lima bean
Maize (Sweet corn)
Muskmelon
Mustard
Okra
Onion
Parsley
Parsnip
Pea
Peanut
Pepper
Potato
Pumpkin
Radish
Rhubarb
Salsify
Shallot
Sorrel
Soybean
Spinach
Squash
Swede
Sweet potato
Swiss chard
Taro
Tomato
Turnip
Watermelon
Yam

Other related articles

Agriculture
Food
Food, Frozen
Food preservation
Gardening
Horticulture
Nutrition (Basic food groups)
Plant
Market gardening
Vegetable oil
Vegetarianism

Vegetable ivory. See **Ivory palm.**

Vegetable oil is a fatty substance obtained from certain plants. Vegetable oils are used mainly in producing or cooking many kinds of food. Most of these oils are liquids, but a few, including cocoa butter, coconut oil, and palm oil, are solids at room temperature. Vegetable oils consist almost entirely of fat, an essential part of a healthy diet. For more information on their food value and chemical composition, see **Fat.**

Manufacturers obtain most vegetable oils from seeds and fruits. Seeds provide such oils as coconut, cottonseed, linseed, maize, palm kernel, peanut, rapeseed, safflower, soybean, and sunflower oil. Oils extracted from fruits include olive and palm oil.

Uses. Important oils include cottonseed, maize, olive, peanut, safflower, soybean, and sunflower oil. Many people use these oils to fry foods and as salad oil. Manufacturers make most margarine and salad dressings with such oils as soybean or sunflower oil. Cocoa butter or coconut oil is a chief ingredient in various sweets.

Many nonfood products also contain vegetable oils. For example, manufacturers make certain cosmetics and soaps from coconut or palm oil. Many paints and varnishes contain a drying oil, such as linseed, soybean, or tung oil. Drying oils combine with oxygen from the air to form a tough coating. See **Oil** (Fixed oils).

Production. Manufacturers use various methods to extract oil from plants. One common process, called *solvent extraction,* involves soaking the seeds or fruit in a liquid known as a *solvent.* The solvent draws the oil out of the plant material. Machines then remove the plant material from the resulting mixture and evaporate the solvent, leaving only the crude oil.

Another method of extraction, called *expeller pressing,* uses a high-pressure press. This powerful machine squeezes nearly all the oil out of the seeds or fruit. However, the high pressure heats the oil, causing it to develop a dark colour and undesirable flavour. The oil also loses some of its nutritional value. *Prepress solvent extraction* uses less pressure than does expeller pressing and extracts only some of the oil. A solvent is used to obtain the remaining vegetable oil.

Oils obtained by solvent extraction, expeller pressing, or prepress solvent extraction require further processing to make them suitable for use in foods. Machines refine, bleach, and deodorize the oils to create a clear, mild-tasting product. Oils obtained by an extraction method called *cold-pressing* do not require such processing. Cold pressing, which uses low pressure to squeeze out the oil, generates little heat. As a result, the oil retains its original flavour, colour, and nutritional value. However, cold-pressing removes less oil from a plant than do the other processes, and few manufacturers use it.

Related articles in *World Book* include:

Castor oil
Chocolate
Copra
Corn oil
Cottonseed oil
Linseed oil
Margarine
Olive oil
Paint (Household paints)
Palm oil
Peanut
Rape
Safflower
Soybean
Sunflower
Tung oil
Varnish

Vegetarianism is the practice of not eating meat. Vegetarians regard the flesh of all animals, including that of fish and poultry, as meat. Most vegetarians avoid eating meat because of moral or religious beliefs. They believe it is wrong to kill animals for food. Many vegetarians also think that eating meat is unhealthy.

Some vegetarians exclude milk and eggs, as well as meat, from their diet because these foods come from animals. Vegetarians are divided into three groups, based on their attitude toward drinking milk and eating eggs. *Lacto-ovo-vegetarians* include milk and eggs, and foods made from milk and eggs, in their diet. *Lacto-vegetarians* do not eat eggs, but they drink milk and eat such milk products as butter and cheese. *Vegans* avoid milk and eggs and all of the foods that are made from these animal products.

A vegetarian diet must be well planned to provide the protein and certain other nutrients that the body needs and that meat contains. Most lacto-ovo-vegetarians and lacto-vegetarians can easily plan a healthy diet because milk and eggs are good sources of high-quality protein. Milk also provides large amounts of calcium, which helps strengthen bones. Milk and eggs both contain vitamin B_{12}, which forms a part of red blood cells and helps the nerves function properly.

Vegans must plan their diet especially well because no single fruit, vegetable, or grain contains the nutritionally complete protein found in meat, milk, and eggs. Beans, nuts, peas, and many other vegetarian foods contain large amounts of protein. However, these foods must be eaten in particular combinations to provide the body with nutritionally complete protein. For example, beans and rice eaten together provide complete protein, but neither food does when eaten alone. To obtain calcium, vegans must eat sesame seeds or certain green leafy vegetables, such as broccoli or spinach. Most vegans take vitamin B_{12} tablets to obtain the necessary amount of this nutrient.

Most vegetarians consume less saturated fat and smaller amounts of a fatty substance called *cholesterol* than most meat-eaters do (see **Cholesterol; Fat**). These lower dietary levels of saturated fat and cholesterol result in lower levels of cholesterol in the blood. Medical research indicates that a high level of cholesterol in the blood is associated with heart disease. Some studies have shown that vegetarians are healthier and live longer than other people.

Vegetarianism is practised by some religious groups, including Hindus and Seventh-day Adventists. Some people practise vegetarianism because they believe the high consumption of meat, especially beef, reduces the world food supply. They object to the fact that cattle in some countries, notably the United States, are fed grain. These people think the grain should be used for human consumption rather than as animal feed because the livestock consume more calories than they produce. Some people also believe that the land on which livestock graze should be used to grow grain. But many agricultural experts disagree. They argue that most grazing land is not suitable for crop farming.

Vegetation. See **Forest; Grassland; Plant; Desert.**

Vegetative state. See **Death** (Defining death).

Vein is a blood vessel which carries blood toward the heart. The blood circulates in the body through a system of tubes called blood vessels. The three kinds of vessels are arteries, capillaries, and veins. Most veins return blood to the heart after it has given out nourishment to the tissues and taken up waste products and poisons. Blood in veins is called *venous* blood. See the Trans-Vision three-dimensional picture with **Human body.**

The blood returning from the body cells has lost much of its oxygen, and is dull, brownish-red. It circulates through the right side of the heart and then goes to the lungs. Here it gives off its waste carbon dioxide and takes on a new supply of oxygen. Bright red blood from the lungs returns to the heart through the pulmonary veins. Then it begins its trip through the body.

The veins begin at the capillaries. At first they are very tiny, and are called *venules.* Small veins join to form larger ones. Finally all the venous blood of the body pours into two very large veins which open into the heart. One of these, the *superior vena cava,* carries blood from the head and arms. The other, the *inferior vena cava,* carries it from the trunk and legs.

Veins, like arteries, have walls made of three layers. But the vein walls are thinner, less elastic, and less muscular than those of the arteries. The lining membrane of the veins is the *intima.* In many of the larger veins, the intima has folds which serve as valves. These folds lie against the wall when the blood is flowing freely. Several things can cause the blood to slow down or stop—the weight of blood above the vessel, effects of gravity, pressure on a vein, or low fluid pressure. Then the valves open out, and stop the blood from flowing backward. The valves are usually just above the place where two veins join. There are no valves in the veins of the abdomen, brain, and lungs, or in the smaller veins.

Veins that are swollen, stretched, or coiled on themselves are *varicose* veins. *Phlebitis* is inflammation of a vein. Phlebitis may produce redness, tenderness, swelling, and pain in the area of the vein.

Related articles in *World Book* include:

Aneurysm
Artery
Bloodletting
Heart
Jugular vein
Phlebitis
Varicose vein

Vein. See **Leaf** (The parts of a leaf).

Velázquez, Diego (1599-1660), was an important Spanish baroque painter. Many characteristics of his style can be seen in one of his masterpieces, *Las Meninas* (*Maids of Honour*), which is reproduced in the

Painting article. *Las Meninas* shows Velázquez' use of realism, rich colours, light and shadow. In addition, it shows the painter's ability to place his subjects in space. Velázquez was a painstaking craftsman who constantly reworked his canvases. He has influenced such later artists as Gustave Courbet, Édouard Manet, and Pablo Picasso. See **Baroque** (Baroque painting).

The Metropolitan Museum of Art, New York City

Velázquez painted this well-known portrait of himself.

Diego Rodriguez de Silva y Velázquez was born in Seville. As a youth, he studied with Francisco Pacheco. Pacheco taught him the style of the Italian artist Michelangelo Caravaggio, characterized by its realism and use of sombre light and dark tones. Velázquez began to paint for King Philip IV in 1623, and was a successful court painter for the rest of his life.

In 1629, Velázquez went to Italy, where he studied the art of ancient Rome and perfected his ability to paint nudes. After his return to Spain in 1631, he produced a series of great royal portraits as well as *The Surrender of Breda* (*The Lances*), one of the world's finest historical paintings. He again visited Italy from 1649 to 1651. While in Rome he painted Pope Innocent X and also produced his only pure landscapes. After his return to Spain, Velázquez painted some of his best works. These include his most dazzling court portraits; *Venus with a Mirror,* one of the few nudes in Spanish art; and *Las Meninas.*

Oil painting on canvas (about 1650); Metropolitan Museum of Art, New York City

Velázquez' portrait of Juan de Pareja shows how well the Spanish painter captured the personality of his subjects.

Veld is a word from the Afrikaans language used to describe natural vegetation in South Africa. It means *field* or *plain.* The veld is a form of grassland similar to the prairies of North America. In certain instances, veld refers to any area of natural vegetation. The Highveld of central Transvaal is flat with rolling, grass-covered plains and few trees. The Lowveld of eastern Transvaal is more tropical and has bushes and trees. The Bushveld of northern Transvaal is grass-covered with scattered trees, such as baobab, ironwood, and leadwood. The veld areas are home to the large grass-eating mammals of southern Africa. Also, the Khoi and San peoples ate *veldkos* (edible plants growing in the veld). Today, many plants from other areas have spread into the veld. Other problems affecting the nature of the veld include erosion, overgrazing, droughts, and the spread of farming.

Vellum is fine animal skin used for paper. See **Book** (Early books); **Parchment.**

Velocity is the rate at which a body moves in space in a given direction. Velocity is expressed in distance and time, such as metres per second. There is an important difference between speed and velocity. *Speed* indicates the rate of motion, but it does not indicate anything about the direction of motion. When a body is said to have a speed of 40 kilometres per hour, the direction is unknown. To specify the *velocity,* it is necessary to indicate both the rate and the direction of motion. For example, a body may have a velocity of 40 kilometres per hour toward the north. Mathematically, velocity is a *vector* quantity, because it has both speed and direction.

Types of velocity. Velocity may be *uniform,* which means the distances and the direction travelled during a given unit of time are the same throughout the motion. To find the uniform velocity of a body, we need only divide the distance travelled by the time. This could be stated in the formula $v = \frac{d}{t}$ where v is equal to velocity, d is equal to distance, and t is equal to time.

Velocity may be *variable.* This means that the distances travelled in a given unit of time are not equal throughout the motion, or that the direction changes, or both. For example, a moving object could have a velocity of 30 metres per second at a certain instant and then speed up to 60 metres per second. If the object gained speed uniformly, its average velocity would equal its initial velocity plus its final velocity divided by two. This could be written

$$\text{Av. } v = \frac{v_1 + v_2}{2}$$

where Av. v represents the average velocity, v_1 is equal to the initial velocity and v_2 is equal to the final velocity.

Acceleration. A change in the velocity of a moving body is called *acceleration. Positive acceleration* means that, during each portion of time, the body moves through a greater distance than during the preceding portion of time. A falling body has a positive acceleration. In *negative acceleration,* such as a train stopping, a smaller space is travelled in each successive unit of time. *Centripetal acceleration* occurs when the rate of motion stays the same, but the direction changes.

See also **Motion; Falling bodies, Law of; Calculus.**

Velvet is a handsome fabric with a soft and luxurious feel. It may be made of silk, rayon, nylon, polyester, acetate, or a combination of these fibres. Weavers make many weights and types of velvet. Some are lightweight and almost transparent, and others are thick and heavy. Lightweight velvet is generally made into clothing.

The softness and rich appearance of velvet result from its construction. Two sets of yarns—called the *warp*—run the length of the fabric, and another set—called the *filling*—is placed in a crosswise direction. One warp is tightly interlaced with the filling. The other is held more loosely to form a series of closely spaced loops that stand on top of the fabric. These loops are cut open at the top to form the *pile,* a short, thick, furry surface on the fabric. The pile consists of threads that partly reflect light. The reflection of light from the surface of the pile gives velvet its attractive appearance.

Velvetleaf is a weed that has velvety, heart-shaped leaves. It is a member of the mallow family (see **Mallow**). The plant is native to China. It is also called *Indian mallow, butterprint,* and *stamp weed.* Velvetleaf was once used to stamp designs on hand-churned butter.

Velvetleaf grows from less than 30 centimetres to more than 1.8 metres tall, depending on the fertility of the soil. The plant has attractive yellow flowers and fruit with 10 to 15 seed-containing beaks radiating from the centre. Velvetleaf was introduced into the New World as a potential fibre crop. It has become a troublesome weed and is a special pest in maize and soybean fields.

Scientific classification. Velvetleaf belongs to the mallow family, Malvaceae. Its scientific name is *Abutilon theophrasti.*

Velvetleaf has yellow flowers

Vendetta is a family feud once common in Italy, especially in Sicily. One family fought another, often savagely, to avenge a personal injury or murder. The victim's nearest relative had to take revenge on the offender. If the offender could not be punished, vengeance had to be taken on the next of kin. Vendettas were similar to the family feuds that have taken place in many other parts of the world.

See also **Feud.**

Vending machine is a self-service device that dispenses a product or service when money or a token, card, or key is inserted into it. Vending machines dispense many types of merchandise, such as sweets, cigarettes, coffee, ice cream, and soft drinks. Some vending machines may be available for use 24 hours a day.

How vending machines work. Most vending machines accept coins. With some types, the user must insert the exact change before the machine will operate. With others, the user can insert a coin or paper money of greater value than the purchase price. The machine will give change along with the item. A special vending machine called a *currency changer* accepts paper money and gives change. Some currency changers can distinguish between notes of different denominations. They give change for each denomination that they can accept.

The vending machine industry is composed of manufacturing companies, operating companies, and companies that supply the products sold in the machines. Some companies provide coffee, snack, and soft drink machines for their employees. Some businesses, schools, industries, and hospitals also provide vending machines that dispense soups, salads, sandwiches, fruit and desserts, and even complete meals. Postage stamps are usually available through vending machines. In addition to product machines, there are vending machines that provide services. In some airports, vending machines sell air travel insurance.

History. A device that dispensed holy water in a Greek temple in Alexandria, Egypt, in 215 B.C. is the earliest known vending machine. The first vending machines appeared in the 1880's in Europe and the United States. Since then the use of vending machines has spread throughout the world.

Veneer is a thin sheet of wood of uniform thickness cut by peeling, slicing, or sawing logs. It is used chiefly for plywood panels made by gluing sheets of veneer together. Usually, these sheets are arranged so that the direction of the *grain* (wood fibres) of one sheet is at right angles to the grain of the next sheet, thus increasing the strength of the plywood panels. Single sheets of veneer are used to make such items as fruit baskets and crates.

Most veneer is cut from the Douglas fir, but many other varieties of wood are also used. There are several ways of cutting veneer, but the most popular is the *rotary-cut* method. In this method, the log is placed in a lathe and then revolved against a knife extending across the length of the log. The veneer is unwound in a long ribbon, much like unrolling a bolt of wrapping paper or cloth. Veneers vary in thickness from 0.25 to 9.5 millimetres. Most rotary veneers are cut in thicknesses from 1.3 to 3.6 millimetres.

See also **Furniture** (Louis XIV furniture); **Mahogany; Plywood.**

Venerable Bede, The. See **Bede.**

Venereal disease. See **Sexually transmitted disease.**

Venetian blind is a window blind made of slats. Venetian blinds are given this name because they were widely used in Venice during the 1600's. Similar curtains had been developed earlier by the Japanese, who used bamboo rods. Today, Venetian blinds have slats made of metal, wood, or some other sturdy material. The slats are hung on tapes so that each slat slightly overlaps the next one when they are closed. The slats are operated by cords and pulleys that can be adjusted to keep out sunlight but admit breezes.

A residential area in Caracas, Venezuela's capital and largest city, has many high-rise apartment buildings. In most Venezuelan cities, modern apartment buildings like these are rapidly replacing traditional Spanish-style houses, which have one storey and centre on a courtyard.

Venezuela

Venezuela is a prosperous South American country that ranks as one of the world's leading producers and exporters of petroleum. Before its petroleum industry began to boom during the 1920's, Venezuela was one of the poorer countries in South America. Its economy was based on such agricultural products as cacao and coffee. Since the 1920's, however, Venezuela has become one of the wealthiest and most rapidly changing countries on the continent. Income from petroleum exports enabled Venezuela to carry out huge industrial development and modernization programmes.

Venezuela lies on the north coast of South America along the Caribbean Sea. Mountain ranges extend across much of northern Venezuela, which is the most densely populated region of the country. Caracas, the capital and largest city, lies in this region. Vast plains called the *Llanos* spread across central Venezuela. High plateaus and low mountains cover the southern part of the country.

About 90 per cent of Venezuela's people live in cities and towns. Nearly all Venezuelans speak Spanish. Most of the people are descendants of Europeans, American Indians, and Africans who intermarried.

Christopher Columbus landed in what is now Venezuela in 1498 on his third voyage to the New World. It was his first landing on the mainland of the Americas. Later, European explorers in northwestern Venezuela found Indian villages where the houses were built on poles over the waters of the Gulf of Venezuela and Lake Maracaibo. Some of the explorers were reminded of the Italian city of Venice, where buildings stood along the water. They named the area *Venezuela,* which is Spanish for *Little Venice.* Later, the name Venezuela was applied to a large area of northern South America. Spain ruled Venezuela for about 300 years. In 1811, Venezuela declared its independence.

Government

Venezuela is a federal republic. All citizens 18 years and older may vote. Since 1811, the country has had 26 constitutions. Venezuela's present Constitution was adopted in 1961.

Facts in brief about Venezuela

Capital: Caracas.
Official language: Spanish.
Official name: República de Venezuela (Republic of Venezuela).
Area: 912,050 km^2. *Greatest distances*– north-south, 1,271 km; east-west, 1,489 km. *Coastline*–2,816 km.
Elevation: *Highest*–Pico Bolívar, 5,002 m above sea level. *Lowest*–sea level along the coast.
Population: *Estimated 1996 population*–20,490,000; density, 23 people per km^2, distribution, 93 per cent urban, 7 per cent rural. *1990 census*–18,105,265. *Estimated 2001 population*–22,459,000.
Chief products: *Agriculture*–bananas, beef cattle, chickens and eggs, milk, coffee. *Manufacturing*–refined petroleum, petrochemicals, aluminium, steel, processed foods, textiles. *Mining*–petroleum, natural gas.
National anthem: "Gloria al Bravo Pueblo" ("Glory to the Brave People").
Money: *Currency unit*–bolívar. One bolívar = 100 centimos.

National government. A president, elected by the people, serves as Venezuela's head of state and as head of the executive branch of government. A presidential election is held once every five years. The National Congress, which forms the legislative branch, consists of the 203-member Chamber of Deputies and the 49-member Senate. Voters elect the deputies and senators to five-year terms. The Supreme Court of Justice is the highest court in the country.

Local government. Venezuela is divided into 20 states, 2 federal territories, and the Federal District. Each state and territory, and the Federal District, has a legislature elected by the people and a governor appointed by the president. The country also has many islands in the Caribbean that are federal dependencies.

Armed forces. About 69,000 people serve in Venezuela's army, navy, air force, and national guard. Men may be recruited for two years of military service after reaching 19 years of age.

People

Population. Venezuela has a population of about 20 million. About 90 per cent of the people live in cities and towns. The rest live in rural areas. Caracas, the capital and largest city, has about $1\frac{1}{4}$ million people. About $3\frac{1}{3}$ million people live in the Caracas metropolitan area. Venezuela has six other cities with populations of over 400,000. They are Barquisimeto, Ciudad Guayana, Maracaibo, Maracay, Petare, and Valencia.

Ancestry. Numerous Indian tribes lived in what is now Venezuela before the 1500's, when Spain colonized the area. The Spanish conquered many of the Indian tribes. They also imported black slaves from Africa. Many of the Indians, Spaniards, and blacks intermarried. Today, about two-thirds of Venezuela's people are of mixed ancestry. People of unmixed white, black, or Indian ancestry make up the rest of the population.

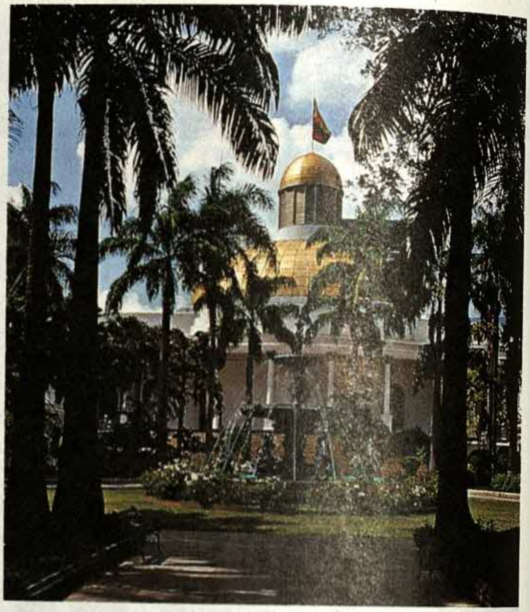
After 1945, and especially in the 1950's, many Europeans and Colombians moved to Venezuela to seek jobs. Most of the Europeans came from Spain, Italy, and Portugal. Many Colombians entered Venezuela illegally in the 1970's and 1980's.

Languages. Almost all Venezuelans speak Spanish, the country's official language. Indians in remote areas speak various tribal languages.

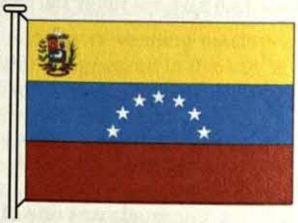
Ways of life. Compared with some other Latin-American countries, Venezuela has an open society. In general, the people are not rigidly segregated on the basis of ethnic or class differences. Venezuela thus differs from countries that have a strict class system based on ancestry.

Since the 1940's, many Venezuelans have moved from rural areas to the cities. As the cities have grown, so has the country's middle class. Members of the middle class include business people; government workers; and doctors, lawyers, teachers, and other professionals. Most middle-class Venezuelans live comfortably, dress well, own a car, and take holidays regularly. Some families live in one-storey, Spanish-style houses that centre around a courtyard. But in most cities, such houses are being rapidly replaced by high-rise apartments.

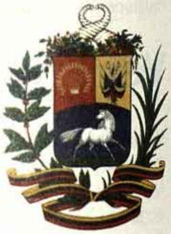
Although Venezuela's middle class has grown, poverty remains a major problem. Housing is scarce, and many Venezuelans live in crowded squatter settlements



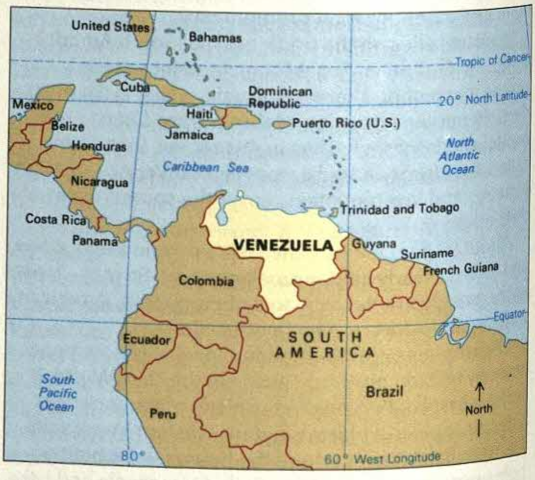
The Venezuelan Capitol in Caracas houses the National Congress. This view of the Capitol shows part of its large courtyard. The building was completed in 1872.



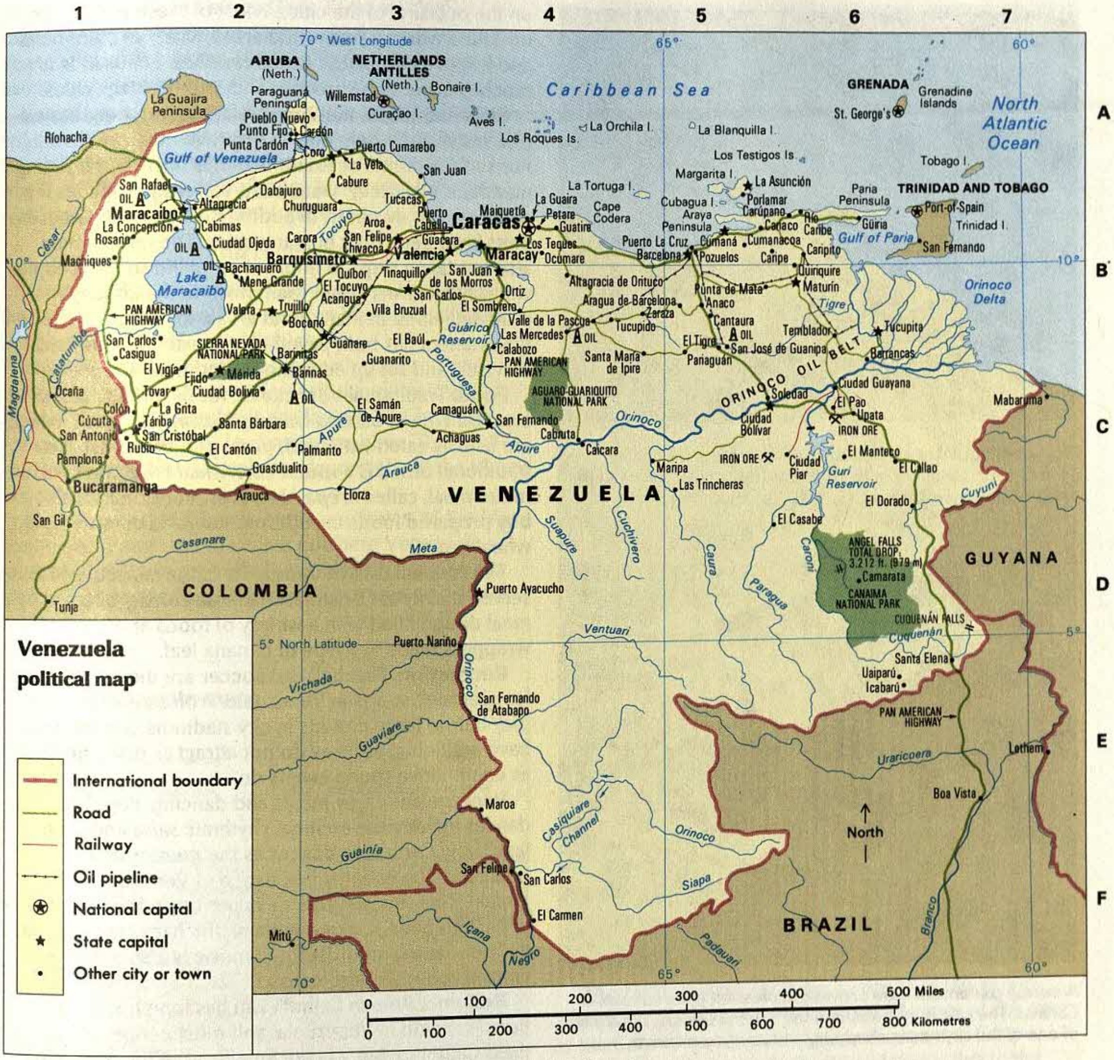
Venezuela's state flag, used by the government, was adopted in 1954. The national flag omits the coat of arms.



Coat of arms. The running horse symbolizes liberty; the wheat sheaf, unity; and the swords, independence.



Venezuela lies on the north coast of South America along the Caribbean Sea. It borders Colombia, Brazil, and Guyana.



Venezuela political map

States and other divisions*

Amazonas (federal territory)	80,011	E	4
Anzoátegui	838,714	B	5
Apure	243,570	C	3
Aragua	1,241,982	B	4
Barinas	441,437	C	2
Bolívar	932,476	D	6
Carabobo	1,496,710	B	3
Cojedes	184,586	B	3
Delta Amacuro (federal territory)	92,610	B	6
Federal dependencies	1,100	A	4
Federal District	2,570,390	B	4
Falcón	610,749	A	3
Guárico	465,550	C	4
Lara	1,185,014	B	2
Mérida	594,354	C	2
Miranda	1,901,893	B	4
Monagas	487,264	B	6
Nueva Esparta	264,172	A	5
Portuguesa	571,593	B	3
Sucre	720,293	B	5
Táchira	819,079	C	1
Trujillo	534,996	B	2
Yaracuy	364,431	B	3
Zulia	2,115,517	B	1

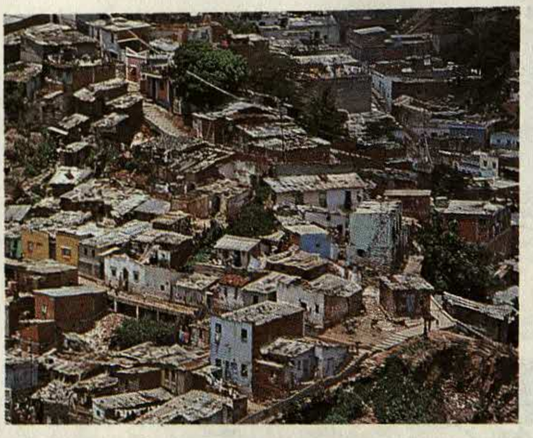
Cities

Acarigua	123,320	B	3
Altagracia	24,375	B	2
Altagracia de Orituco	42,354	B	4
Anaco	52,322	B	5
Araure*	61,817	B	3
Barcelona	226,805	B	5
Barinas	165,417	C	2
Barquisimeto	681,961	B	3
Baruta*	264,068	B	4
Boconó	23,712	B	2
Cabimas	163,454	B	2
Cabudare*	38,852	B	3
Cagua*	78,026	B	4
Calabozo	80,782	B	4
Cantaura	25,153	B	5
Caraballeda*	31,533	B	4
Caracas	1,261,116 *3,310,236	B	4
Caripito	20,762	B	6
Carora	76,016	B	2
Carrizal*	29,303	B	5
Carúpano	76,615	B	6
Catia La Mar*	126,568	B	4
Chacao*	77,086	B	4
Charallave*	47,883	B	4
Chivacoa	32,171	B	3
Ciudad Bolívar	249,590	C	5
Ciudad Guayana	484,061	C	6
Ciudad Ojeda	95,386	B	2
Colón	29,792	C	1
Coro	127,745	A	3
Cúa*	38,895	B	4
Cumaná	222,980	B	5
Ejido	29,125	C	2
El Hatillo*	45,997	B	4
El Tigre	87,146	B	5
El Tocuyo	28,471	B	3
El Vigia	60,615	C	2
Goaigoaza*	34,612	A	3
Guacara	112,118	B	3
Guanare	95,343	B	3
Guarenas*	165,496	B	4
Guatire	53,718	B	4
Güigüe*	38,888	B	4
La Asunción	12,934	A	5
La Guaira	26,154	B	4
La Victoria*	101,111	B	4
La Victoria*	20,164	B	2
Los Dos Caminos*	74,656	B	4
Los Teques	154,031	B	4
Machiques	36,539	B	1
Maiquetía	81,175	B	4
Maracaibo	1,151,933	B	2
Maracay	510,926	B	4
Mariara*	78,197	B	4
Maturín	212,810	B	6
Mérida	193,006	C	2
Morón*	52,288	B	3
Nirgua*	20,914	B	3
Ocumare	53,183	B	4
Palo Negro*	34,638	B	4
Petare	507,260	B	4
Porlamar	62,777	B	5
Pozuelos	101,605	B	5
Puerto Ayacucho	54,414	D	4
Puerto Cabello	87,328	B	3
Puerto La Cruz	59,833	B	5
Punta Cardón	40,888	A	2
Punto Fijo	87,618	A	2
Quíbor	37,147	B	3
Rosario	30,957	B	1
Rubio	41,784	C	1
San Antonio*	41,890	B	4
San Antonio	32,787	C	1
San Carlos	53,313	B	3
San Carlos	35,231	B	1
San Cristóbal	238,650	C	1
San Felipe	65,680	B	3
San Fernando	81,871	C	4
San Joaquín*	28,783	B	5
San José de Guanipa	44,385	B	5
San Juan de los Morros	70,726	B	4
San Mateo*	27,832	B	4
Santa Rita*	24,889	B	2
Santa Teresa*	56,121	B	4
Tacarigua*	33,146	B	3
Táriba	21,101	C	1
Tinaquillo	45,600	B	3
Tovar	22,150	C	2
Trujillo	40,103	B	2
Tucupita	46,493	B	6
Turmero*	187,230	B	4
Upata	44,030	C	6
Valencia	889,228	B	3
Valera	134,508	B	2
Valle de la Pascua	69,543	B	4
Villa Bruzual	29,671	B	3
Villa de Cura	47,890	B	4
Yaritagua*	38,484	B	3
Zaraza	31,613	B	5

*Not shown on map; key indicates general location.

*Population of metropolitan area, including suburbs.

Source: 1988 official estimates.



Crowded squatter settlements cover large areas in and around many Venezuelan cities. In Caracas, almost a third of the people live in *ranchos* (small shacks) like those above.

A sunny pavement cafe provides a pleasant place to relax in Caracas. The cafe is on a street in the Sabana Grande, the name of one of the city's main shopping and business districts.

A rodeo, held near the city of Barinas, attracts many young Venezuelans. Barinas is the capital of the state of Barinas, a cattle-rearing area in the western part of the country.

on the outskirts of the cities. Most of these people are unskilled workers from rural areas. Many of them build and live in small shacks called *ranchos.* Thousands of ranchos cover large areas in and around many cities.

Since the 1960's, the Venezuelan government has carried out massive schemes to improve the living conditions of the poor. For example, it has furnished building materials, electricity, water, and sewerage facilities for some rancho dwellers. In addition, large public housing units have been built in many cities. The government also has taken steps to improve rural life so that people will stay on farms rather than move to the already crowded cities. In many rural areas, for example, the government has built paved roads, extended electrical services, and set up educational and health facilities.

Food. Traditional Venezuelan foods include black beans, a type of banana called *plantains,* and rice, which are usually eaten with beef, pork, poultry, or fish. The traditional bread is a round *corn-meal* cake, made of maize meal, called *arepa.* However, Venezuelans also buy prepared foods in supermarkets and commonly eat wheat bread.

The national dish of Venezuela is the *hallaca,* which is served mainly at Christmas. Hallacas consist of corn-meal dough filled with a variety of foods and cooked in wrappers made of a type of banana leaf.

Recreation. Baseball and soccer are the most popular spectator sports in Venezuela. Professional teams play before large crowds in city stadiums. Several cities have bullfights, but they do not attract as many people as competitive sports events do.

Venezuelans enjoy music and dancing. Popular dances include the exciting, rhythmic *salsa* and such fast, lively Caribbean dances as the *merengue* and *guaracha.* The national folk dance of Venezuela is the *joropo.* This stamping dance is performed to the music of *cuatros* (four-stringed guitars), the harp, and *maracas* (rattles made of gourds). Rock music is also popular among young Venezuelans.

Religion. Roman Catholicism has long been the traditional religion in Venezuela, and most people are baptized Catholics. But it is not an official religion, and the Constitution guarantees freedom of worship.

Education in Venezuela has improved greatly since the 1960's. Today, about 85 per cent of the people 15 years of age or older can read and write, compared with about 63 per cent in 1960. Yet one of Venezuela's chief problems is a shortage of skilled workers and scientists. In 1974, the government began a massive scholarship programme. The programme has granted thousands of scholarships to university-age Venezuelans.

Venezuelan law requires all children from the ages of 7 to 13 to attend school. Venezuelans can receive a free state education from kindergarten to university graduate school. The country has 10 state and 5 private universities. The largest and most important is the Central University of Venezuela, a state university in Caracas.

The arts. During the 1900's, several Venezuelan writers and artists have won international fame. The novelist Teresa de la Parra and the poet Andrés Eloy Blanco were among the most important writers. But probably the best-known writer was Rómulo Gallegos, who also served as president of the country in 1948. Gallegos portrayed the distinctive character of different regions of

Venezuela in such novels as *Doña Bárbara* (1929), *Canaima* (1935), and *Pobre Negro* (1937). The leading Venezuelan artists of the 1900's include the abstract painters Alejandro Otero and Jesús Soto.

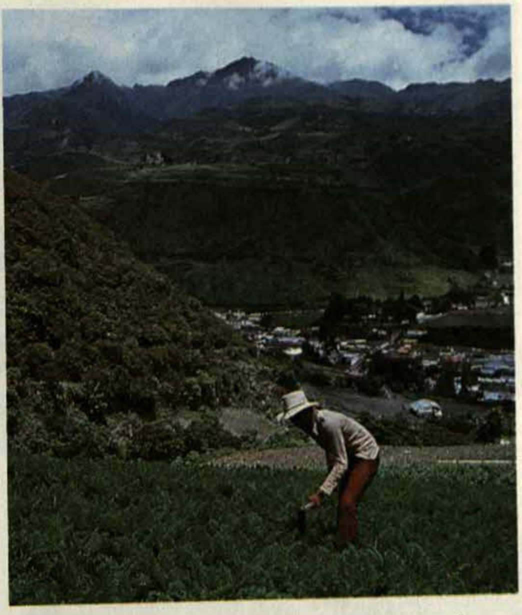
Venezuela also has produced some spectacular modern architecture. Outstanding examples can be found on the campus of the Central University of Venezuela, where boldly designed buildings have been integrated with imaginative murals and sculptures.

Land regions

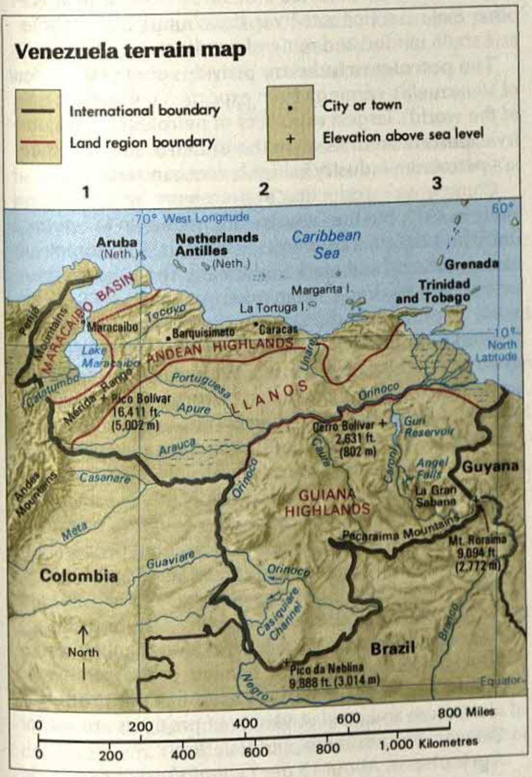
Venezuela has four major land regions. They are (1) the Maracaibo Basin, (2) the Andean Highlands, (3) the Llanos, and (4) the Guiana Highlands.

The Maracaibo Basin lies in northwestern Venezuela and consists of Lake Maracaibo and the lowlands around it. Lake Maracaibo is the largest lake in South America. It covers 13,512 square kilometres. The continent's largest known petroleum deposits lie in the Maracaibo Basin.

The Andean Highlands begin southwest of the Maracaibo Basin and extend across northern Venezuela. Most of Venezuela's people live in this region. The region has three sections. They are, from west to east: (1) the Mérida Range, (2) the Central Highlands, and (3) the Northeastern Highlands.



The Andean Highlands begin southwest of the Maracaibo Basin and extend across northern Venezuela. Many small farms and towns lie in the mountains. This farmer is tending carrots.



Venezuela terrain map

Physical features

Andean Highlands	B	2
Angel Falls	C	3
Apure River	B	2
Casiquiare Channel	D	2
Guiana Highlands	C	2
Guri Reservoir	B	3
La Gran Sabana (plateau)	C	3
Lake Maracaibo	B	1
Llanos (plains)	B	2
Maracaibo Basin	A	1
Margarita Island	A	2
Mérida Range	B	1
Orinoco River	B	3
Pacaraima Mountains	C	3
Pico Bolívar (peak)	B	1

The Mérida Range consists of mountain ranges and high plateaus. Pico Bolívar, the highest point in Venezuela, rises 5,002 metres above sea level.

The Central Highlands consist of two parallel mountain ranges along the Caribbean coast. Fertile valleys lie between the mountain ranges. The Central Highlands have more people and more industries than any other area in Venezuela.

The Northeastern Highlands consist of low mountains and hilly land. A famous natural feature of this area is the Cave of the Guácharo, near the town of Caripe. Thousands of large birds called *guácharos* live in the cave. These birds are found only in northern South America and chiefly in this cave.

The Llanos lie between the Andean Highlands and the Guiana Highlands. The Orinoco River, which begins in the Guiana Highlands, flows from west to east along the southern border of the Llanos. The river and its tributaries drain most of Venezuela. The Orinoco extends 2,066 kilometres and is the longest river in the country.

Large cattle ranches cover much of the Llanos. The cowhands on these ranches are called *llaneros*. The Llanos also have farmland. But the region has a long dry season, and irrigation is needed to grow such crops as rice and sesame. Important oil fields lie in the eastern part of the Llanos.

The Guiana Highlands rise south of the Llanos and cover nearly half of Venezuela. Swift-flowing rivers have deeply eroded the region's high plateaus. Angel Falls, the world's highest waterfall, plunges 979 metres in the Guiana Highlands. Tropical forests cover much of the southern part of the region. See **South America** (picture: Spectacular Angel Falls).

The Llanos consist of gently sloping plains that stretch across central Venezuela. The region has many large ranches on which cowhands called *llaneros* herd cattle on horseback, *left.*

Scattered tribes of Indians live in the Guiana Highlands, but many areas have no inhabitants. The region has valuable deposits of bauxite, iron ore, and gold. Some of the rivers near Ciudad Guayana have been dammed and provide large amounts of electricity.

Climate

Venezuela lies entirely within the tropics. However, the average temperatures vary throughout the country, depending chiefly on altitude. Lowland areas are warm all the year round. The highest average annual temperature—28° C—occurs in the central part of the Llanos and the northern part of the Maracaibo Basin. At higher elevations, the weather is much cooler. In the Andean Highlands at Mérida, the annual temperature averages 19° C.

The amount of rainfall also varies greatly in different parts of Venezuela. Annual rainfall averages about 305 centimetres in the Perijá Mountains, which are west of Lake Maracaibo, and in the southern Guiana Highlands. In contrast, much of the Caribbean coast is dry, and some areas receive only 40 centimetres of rainfall yearly. Most of the rest of the country has alternate wet and dry seasons. In the eastern Llanos, annual rainfall averages about 100 centimetres.

Economy

Venezuelans have a high standard of living in relation to the rest of Latin America. This is due mainly to the country's large petroleum production. But Venezuela's wealth is not distributed evenly among the people, and poverty and unemployment are major problems in some areas. Another difficulty is the economic instability created by changes in the price of petroleum.

Natural resources. Petroleum is Venezuela's most important natural resource. The most productive oil fields lie in the Maracaibo Basin and in the eastern Llanos. Large amounts of natural gas occur in the oil fields. Venezuela also has huge deposits of bauxite, coal, diamonds, gold, gypsum, and phosphate rock.

The Guri Dam on the Caroni River in the Guiana Highlands is one of the largest dams in the world. Many other rivers in that region could be dammed to provide electricity.

Service industries employ about 60 per cent of Venezuela's workers. Service industries include such economic activities as education and health care, wholesale and retail trade, and the operation of hotels and transportation companies. Tourism is an important source of income for several service industries in Venezuela. Another major service activity in the country is the wholesale trade of food and mineral products.

The petroleum industry provides about 80 per cent of Venezuela's earnings from exports. Venezuela is one of the world's largest exporters of petroleum. The country exports most of its oil to the United States. Venezuela's petroleum industry is highly mechanized.

Commercial production of petroleum began in Venezuela in 1917, but the industry did not begin to boom until the 1920's. Foreign firms, especially U.S. companies, produced and marketed the oil. They shared the profits with the Venezuelan government. In 1960, Venezuela helped found the Organization of Petroleum Exporting Countries (OPEC). OPEC promotes the interests of member countries, whose economies depend heavily on oil exports. The Venezuelan government gradually bought out the foreign oil companies in the country, and it *nationalized* (took control of) the entire petroleum industry by 1976.

Manufacturing has grown rapidly in Venezuela since 1970. About 15 per cent of the country's workers are employed in manufacturing. Petroleum processing is the leading manufacturing activity. Venezuela's petroleum refineries produce large amounts of fuels and petrochemicals. Maracaibo is the country's leading centre of petroleum refining. Venezuela's other manufactured products include aluminium, cement, processed foods, steel, and textiles. Ciudad Guayana is a major producer of aluminium and steel. A variety of products are made in Caracas, Barquisimeto, and Valencia.

Agriculture. About 15 per cent of Venezuela's workers are farmers. The main crops include bananas, coffee, maize, oranges, and rice. Farmers also raise beef and dairy cattle, and poultry. More than half of the farms cover fewer than 20 hectares each. But large farms and ranches produce most of Venezuela's commercial farm products.

About half of all Venezuelan farms are operated by their owners, and nearly 13 per cent are rented. Many people farm land that they do not own or rent. Most of these people live in isolated areas where they cultivate small plots called *conucos.* They produce only enough food to support themselves. During the 1960's, the government began programmes that provided farmland for many landless rural families.

Mining. Natural gas ranks second to petroleum among Venezuela's leading mineral products. Other major mineral products mined in the country include bauxite, coal, diamonds, gold, iron ore, and phosphate rock.

Foreign trade. Petroleum and petroleum products and aluminium are Venezuela's leading exports. The country's main imports include chemicals, industrial machinery, and transportation equipment. Venezuela's most important trading partners are the United States, Germany, and Japan.

Transportation and communication. Modern roads link Caracas with other large cities in Venezuela, including Maracaibo, Valencia, and Ciudad Guayana. Most of the roads in rural areas are unpaved. The country has few railways. Maiquetía International Airport, near Caracas, is Venezuela's busiest airport. The country's leading seaports include La Guaira, Maracaibo, and Puerto Cabello.

Venezuela has an average of 1 radio for every 3 people and 1 television for every 7 people. About 60 daily newspapers are published in the country.

History

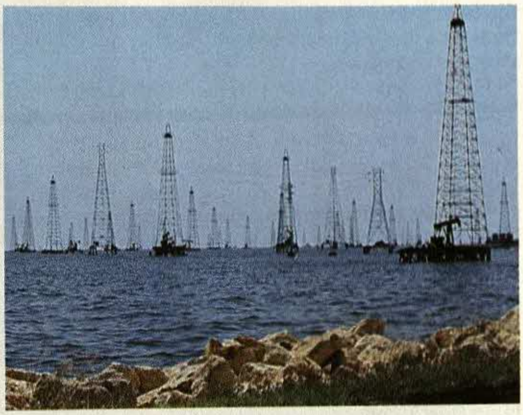
Many Indian tribes lived in what is now Venezuela before European settlers arrived. The chief tribes belonged to two groups—the Carib and the Arawak. The Carib Indians lived in the eastern part of Venezuela, and the Arawak Indians lived in the west. Both groups lived by farming, hunting, fishing, and gathering wild plants. After the Europeans arrived, large numbers of Indians died of diseases brought by the Europeans. Many others starved or were killed in warfare.

European exploration and settlement. Christopher Columbus was the first European explorer to reach Venezuela. In 1498, he landed on the Paria Peninsula. In 1498 and 1499, the Spanish explored most of the Caribbean coast of South America. Spanish settlers soon followed the explorers.

During the early 1500's, the Spaniards came to Venezuela to collect pearls from oyster beds around the islands of Margarita and Cubagua. They called the area from the Araya Peninsula to Cape Codera the Pearl Coast. The Spanish also worked the extensive salt ponds on the Araya Peninsula. These ponds produced salt for several centuries.

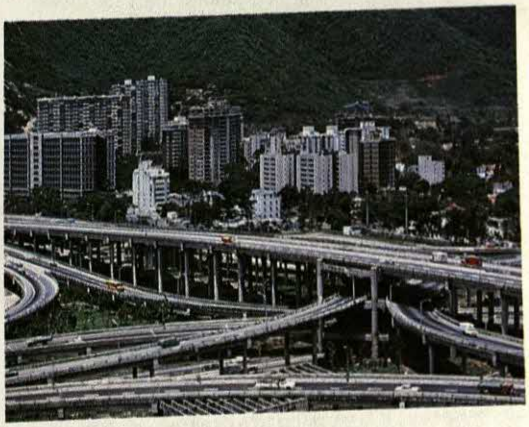
From 1528 to 1546, King Charles I of Spain leased Venezuela to a German banking group to pay off his debts to them. The Germans did little to advance the economy of the colony.

By the 1700's, Venezuela was one of Spain's poorest South American colonies. To increase trade and develop the economy, Spain gave the Royal Guipuzcoana Company of Caracas, a private trading company, the right to control all trade in Venezuela. The company began to operate in 1730. It expanded the colony's economy, which was based on cacao, indigo, and hides. But



The petroleum industry provides 80 per cent of Venezuela's export earnings. Much of the oil comes from the Maracaibo Basin. Many wells are in Lake Maracaibo, *above.*

Iron-ore mining is one of Venezuela's major industries. Cerro Bolívar, *above,* and other mountains of high-grade ore lie in the Guiana Highlands of southern Venezuela.



Modern motorways link the major Venezuelan cities. This motorway interchange in Caracas is popularly called the *araña,* which is a Spanish word meaning *spider.*

the colonists resented the company's rigid control over trade. The firm eventually lost much of its power and went out of business in 1784.

The struggle for independence. During the early 1800's, Spain's South American colonies began to fight for independence. The chief leaders in the independence movement included the Venezuelans Simón Bolívar, Francisco de Miranda, and Antonio José de Sucre. They and their followers fought for many years to free all of northern South America from Spanish rule.

Venezuela was the first Spanish colony in South America to demand its independence. The colony declared its freedom on July 5, 1811, though Spanish forces still occupied much of the country. Venezuela did not become truly independent until 1821. That year, Bolívar won a great victory against the Spanish at Carabobo (near Valencia), which ended Spanish rule in Venezuela. Meanwhile, in 1819, Bolívar had set up and become president of Gran Colombia, a republic that eventually included what are now Venezuela, Colombia, Ecuador, and Panama. Venezuela broke away from Gran Colombia in 1829 and drafted a separate constitution in 1830. General José Antonio Páez, a leader in Venezuela's independence movement, became the first president of the new Venezuelan republic in 1831.

Rule by dictatorships. After achieving independence, Venezuela had many periods of civil unrest. A series of dictatorial *caudillos* (leaders) ruled the country until the mid-1900's. Two of these caudillos, generals Antonio Guzmán Blanco and Juan Vicente Gómez, greatly influenced Venezuela's development.

Guzmán Blanco ruled Venezuela from 1870 to 1888. Before he came to power, the country had been torn by civil wars and political instability. Guzmán Blanco established order. He built roads and communication systems, and foreign firms began to invest in the country.

Gómez ruled Venezuela from 1908 to 1935. He cruelly put down all opposition to his rule. During his administration, the petroleum industry began to develop. With the oil profits, Gómez paid off Venezuela's huge national debt and created a strong army. But he also used some of the profits for personal benefit.

The road to democracy. After 1935, opposition to dictatorship increased greatly among the Venezuelan people. New, reformist political parties were organized. Leaders of a party called the Acción Democrática (AD), supported by the army, seized power in 1945. In 1947, the people elected Rómulo Gallegos of the AD as president. But in 1948, the army overthrew him. Three military leaders jointly ruled Venezuela until 1950, when Marcos Pérez Jiménez became dictator. A revolt against Pérez Jiménez broke out in 1958, and he was forced into exile. Later that year, the voters elected Rómulo Betancourt, a leader of the AD, as president. Since 1958, all Venezuelan presidents have been democratically elected.

Recent developments. In the early 1980's, the worldwide demand for petroleum decreased, and so oil prices dropped. Venezuela's economy, based chiefly on the export of oil, suffered greatly. Today, Venezuela's government seeks to reduce the country's dependence on petroleum. It is working to increase such other economic activities as the production of petrochemicals and of an easily stored fuel called liquefied petroleum gas. The aluminium and steel industries are also being developed. In spite of the country's economic problems, Venezuelans maintain a relatively high standard of living.

In 1974, Carlos Andrés Pérez of the AD became president. Luis Herrera Campins of the Social Christian Party succeeded Pérez in 1979. Jaime Lusinchi of the AD became president in 1984. Pérez again became president in 1989. In May 1993, the Senate removed him from office on charges of misuse of government funds. In December, Rafael Caldera, who had served as Venezuela's president from 1969 to 1974, was again elected president. Formerly a member of the Social Christian Party, Caldera campaigned as an independent candidate in 1993. He headed a coalition of 17 parties that included both socialists and Communists.

Related articles in *World Book* include:

Biographies

Bolívar, Simón
Columbus, Christopher (Third voyage to America)
Miranda, Francisco de
Sucre, Antonio José de

Cities

Barquisimeto
Caracas
Ciudad Bolívar
Maracaibo

Other related articles

Andes Mountains
Angel Falls
Caribbean Sea
Cuquenán Falls
Lake Maracaibo
Latin America
Organization of Petroleum Exporting Countries
Orinoco River
Petroleum (map)
South America
Spanish Main

Outline

I. Government
- A. National government
- B. Local government
- C. Armed forces

II. People
- A. Population
- B. Ancestry
- C. Languages
- D. Ways of life
- E. Food
- F. Recreation
- G. Religion
- H. Education
- I. Arts

III. Land regions
- A. The Maracaibo Basin
- B. The Andean Highlands
- C. The Llanos
- D. The Guiana Highlands

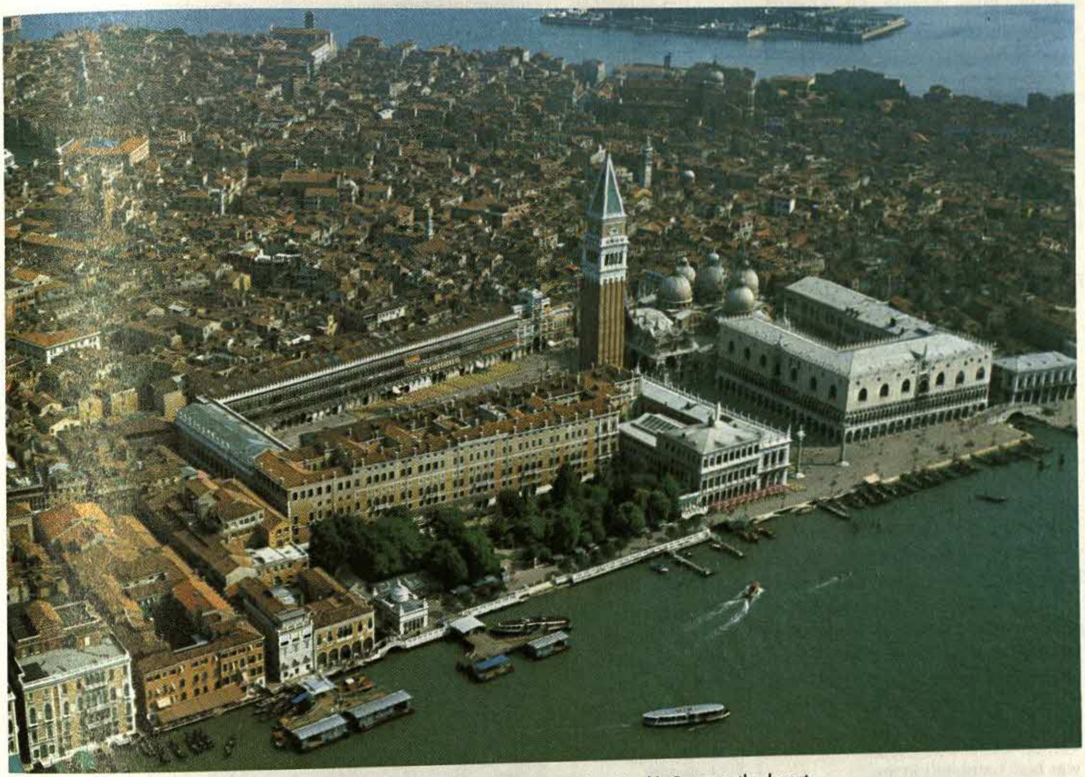
IV. Climate

V. Economy
- A. Natural resources
- B. Service industries
- C. The petroleum industry
- D. Manufacturing
- E. Agriculture
- F. Mining
- G. Foreign trade
- H. Transportation and communication

VI. History

Questions

What is the most densely populated region of Venezuela?
How did Venezuela get its name?
Where in Venezuela are South America's largest known petroleum deposits?
What is the ancestry of most Venezuelans?
What are the *Llanos*?
When did Venezuela become an independent country?
What are Venezuela's main crops?
How has Venezuela used much of its oil income?
What is the religion of most Venezuelans?
Who was the first European explorer to reach what is now Venezuela?



Venice occupies about 120 islands off the northeast coast of Italy. In Saint Mark's Square, the heart of the city, a bell tower called the Campanile, *centre,* rises above the domed roof of the Basilica of Saint Mark. The Doges' Palace stands next to the basilica.

Venice (pop. 309,422), Italy, is one of the world's most famous and unusual cities. Venice lies on about 120 islands in the Adriatic Sea and has canals instead of streets. The people of the city use boats instead of cars, buses, taxis, and trucks. Venice also includes part of the Italian mainland.

Fine architecture and priceless works of art have long helped make Venice a major tourist centre. The city also ranks as one of Italy's largest ports. Venice is the capital of Venetia, one of the 20 political regions of Italy. The city's name in Italian is Venezia.

Venice lies at the north end of the Adriatic Sea, 4 kilometres off the coast of Italy. For location, see **Italy** (political map).

The city's location on the Adriatic made it an important trading centre as early as the A.D. 800's. Venice became a strong sea power and gradually built a colonial empire that extended throughout much of the eastern Mediterranean area. At the height of its power, Venice was known as the "Queen of the Adriatic."

Through the years, Venice lost much of its economic and political strength. But the city's art treasures helped it keep its place as a cultural centre of the world. Today, floods and polluted air and water threaten to slowly destroy the city. People from many parts of the world have joined various campaigns to save Venice.

The city forms a governmental unit of Italy called a *commune.* The islands of Venice make up the historic centre of the city. The modern industrial centres of Marghera and Mestre on the mainland are part of the commune of Venice. See **Italy** (Local government).

A lagoon separates the islands of Venice from the mainland. A roadway over the lagoon carries traffic between the mainland and two of the islands. Cars, buses, and trains use terminals on those islands. More than 150 canals take the place of streets on all the islands of Venice, and boats provide transportation. Black, flat-bottomed boats called *gondolas* once served as the chief means of transportation on the islands. Today, motorboats have replaced most of the gondolas (see **Gondola**). More than 400 bridges cross the canals and link the main islands of Venice. Narrow alleyways called *calli* run between the buildings on the islands.

The Grand Canal, the city's main canal, winds through the heart of Venice. Marble and stone palaces built between the 1100's and 1800's stand along both sides of the Grand Canal. The Rialto Bridge crosses the canal in the heart of the city. Venice's chief shopping district lies along the Merceria, a narrow street that runs from the Rialto Bridge to Saint Mark's Square.

Saint Mark's Square is the centre of activity in Venice. The Basilica of Saint Mark, on the east side of the square, ranks as one of the world's outstanding examples of Byzantine architecture (see **Saint Mark, Basilica of**). A bell tower called the Campanile stands nearby. Buildings in the Renaissance style of architecture rise along the other three sides of the square. Cafes in front of these buildings are favourite meeting places for tourists and for residents of the city. The Doges' Palace, just off the square, was built as a residence for early Venetian rulers called *doges* (see **Doge**).

Priceless artworks may be seen in buildings throughout Venice. The Academy of Fine Arts has an outstanding collection of famous paintings, including works by such Venetian masters as Titian, Tintoretto, and Paolo Veronese. The largest theatre in Venice, the Fenice, presents operas and plays. Hundreds of students attend Venice's schools of architecture, art, and music, and the University of Venice.

Venice has few parks or gardens. But the Lido, a narrow sandbar that borders the islands on the east, is one of Europe's most popular beach resorts.

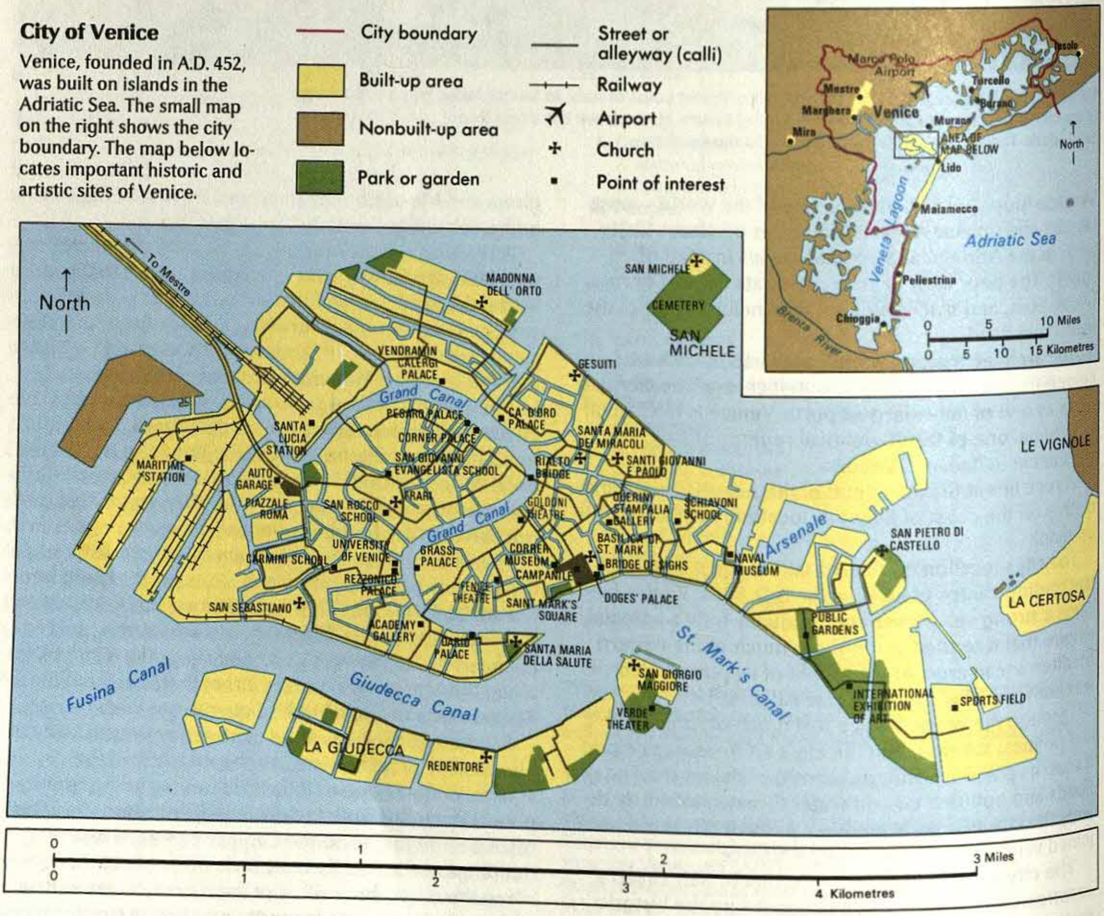
Venice's location gives the city unique characteristics, but it has also caused serious problems. For example, during winter storms, floodwaters sweep through the islands, covering public squares and walkways and damaging buildings. The constant exposure to water is also weakening the foundations of Venice's buildings. In addition, air pollution is eroding the buildings, as well as many of the city's outdoor art treasures. The islands of Venice were sinking an average of about 5 millimetres yearly until the mid-1970's. Scientists believe the sinking resulted partly from the removal of underground water for use by industries. The Italian government restricted the use of water from the city's underground wells. Water pressure then built up under the islands, and the city stopped sinking.

The people of Venice's islands are continually affected by the water that surrounds them. The water influences their food and housing as well as their transportation. For example, seafood is the main course of a typical Venetian lunch or dinner. Houses and other buildings do not stand on solid ground but on wooden *piles* (posts) driven into the mud.

Almost all Venetians are Roman Catholics. Several annual events, in addition to religious holidays, attract large crowds to the city. One of these events, the Feast of the Redeemer, commemorates the end of a plague that struck Venice in 1575. During this all-night festival in July, musicians perform in lighted boats along the canals. A *regatta* (gondola race) is held each September.

Since about 1950, thousands of Venetians have left the islands to live in the mainland communities of Marghera and Mestre. The majority of Venice's people now live in Mestre. Many people have moved because the mainland offers greater job opportunities and a lower cost of living. The modern apartment buildings in Marghera and Mestre also attract many Venetians. Most of the buildings on the islands were erected hundreds of years ago, and there is no room to build new housing.

Economy. Tourism is the chief economic activity of the islands of Venice. About 3 million tourists a year visit



City of Venice

Venice, founded in A.D. 452, was built on islands in the Adriatic Sea. The small map on the right shows the city boundary. The map below locates important historic and artistic sites of Venice.

Canals take the place of streets in Venice, and boats are used for transportation. Most of the buildings that line the canals are hundreds of years old. Bridges link the city's main islands.

the historic centre of the city. They make up an important market for goods produced by craftworkers who live on the various islands. The islands of Murano have won fame for fine crystal and glassware. Lace and embroidered work come from Burano.

The industrial and trade activities of Venice centre in Marghera and Mestre. Factories in these communities produce aluminium, chemicals, coke, fertilizer, paint, petroleum products, steel, and other goods. Venice's port facilities are centred on Marghera.

Industrial development in the mainland portion of Venice has created thousands of jobs for Venetians. But it has also been a major cause of the serious air and water pollution that threaten the city.

History. The first settlers of Venice fled to the islands during the A.D. 400's to escape barbarians who were invading Italy from northern Europe. The early Venetian economy was based on fishing and trading. The Venetians travelled along the Adriatic coasts in search of new markets. By the 800's, Venice was trading with Constantinople (now Istanbul) and cities on the Italian mainland and northern coast of Africa. Venice developed into an almost fully independent city-state, ruled by nobles.

Venetian ships provided the transportation for the Fourth Crusade, which lasted from 1202 to 1204. The Venetians joined the crusaders in battle and conquered the Byzantine Empire, including Constantinople (see **Crusades** [The Fourth Crusade]). The growing strength of Venice led the city into a series of wars with Genoa, a rival sea power. Venice finally defeated Genoa in 1380 and gained control over trade in the eastern Mediterranean Sea. Venice became one of Europe's largest cities. It reached the height of its power during the 1400's, when its colonial empire included Crete, Cyprus, the Dalmatian coast (now part of Croatia), and part of northeastern Italy. Venetian ships carried almost all the silks, spices, and other luxury items that reached Europe from Asia. Venice became a leading centre of Renaissance art in the late 1400's and 1500's (see **Renaissance**).

In the late 1400's, Christopher Columbus journeyed to America and Vasco da Gama discovered a sea route to India. The centre of trade in Europe then shifted to the Atlantic Ocean, and Venice's power declined. The city gradually lost its eastern colonies to the Turks.

In 1797, French forces led by Napoleon Bonaparte occupied Venice. Napoleon divided what was left of the Venetian empire between France and Austria. The city itself came under Austrian control. In 1866, Venice became part of the independent Kingdom of Italy.

The industrialization of Marghera and Mestre began in the early 1900's. During World War II (1939-1945), German troops took over the city. Allied planes bombed the port at Marghera but spared Venice's islands.

In 1966, a disastrous flood that struck much of Italy caused extensive damage in Venice. In the late 1980's, the government approved funding for projects to protect the city from flooding and from erosion caused by pollution.

Related articles in *World Book* include:

Bridge of Sighs
Campanile
Doge
Flag (picture: Historical flags of the world)
Glass (The Middle Ages)
Venetian blind
World, History of the (picture: The Basilica of St. Mark)

Venison. See **Deer.**

Venizelos, Eleutherios (1864-1936), was the dominant figure in Greek politics from 1910 to 1935. He served as prime minister of Greece six times between 1910 and 1933, and he helped Greece acquire many Aegean islands, Crete, and other territories.

In opposition to Greek King Constantine I, Venizelos brought Greece into World War I in 1917 on the side of the Allies (France, the United Kingdom, and Russia). During the early 1920's, he helped prepare Greece for war against the Ottoman Empire. Greece lost this war in 1922. Venizelos also helped persuade the Greeks to establish a republic in 1924.

Venizelos was born on Crete.

See also **Greece** (History).

Venkataraman, Ramaswami (1910-), an Indian politician, was the president of the Republic of India from 1987 to 1992. Before taking up this appointment, he had been vice president since 1984. As well as being a politician, Venkataraman was a barrister in Madras.

Venkataraman was born in Thanjavur province, Tamil Nadu. He was educated at Madras University. As a young man, he was a devoted supporter of the Congress Party. The British imprisoned him in 1942-1944 for his involvement in the Quit India movement. After India obtained independence, Venkataraman served in the provisional parliament in 1950 and twice won a seat in *Lok Sabha* (the lower house of the Indian parliament), in

1952 and 1977 respectively. He was also minister of industry and labour in the Madras state government. He was India's finance minister from 1980 to 1982 and defence minister from 1982 to 1984.

In May 1992, Venkataraman visited China. It was the first official visit by an Indian president to the People's Republic of China.

Venn diagram. See **Set theory** (Diagramming).

Venom is a poisonous substance produced by many kinds of animals. These animals use venom to kill and digest prey. The poison is manufactured by a venom gland and is injected into the victim in various ways.

Venom contains many toxic substances that act together to poison a victim. Some venoms include poisons that block the transmission of nerve impulses to muscle cells, causing numbness and paralysis. Certain substances in venom slow or stop the heart. Many venoms also break down the walls of blood capillaries, causing swelling and internal bleeding. Some venoms contain poisons that cause the victim's blood to clot. Others contain substances that prevent clotting.

Animals that produce venom use various body parts to inject the poison into their victims. Snakes use fangs, many kinds of fish use sharp, bony spines, and bees, hornets, and wasps use stingers. Most kinds of spiders inject venom by biting a victim. Scorpions use claws on their tail to shoot venom into prey.

Venom has many uses in the treatment of illness. For example, doctors use the venom of the Malayan pit viper to treat certain types of heart attacks. Cobra venom is used to relieve some cases of severe pain, and bee venom helps in the treatment of arthritis. Venoms are also used in medical research. For instance, venoms that block the transmission of nerve impulses serve as a tool in the study of nerve function.

Ventilation supplies fresh air to indoor places and removes stale air from these places. For people to feel comfortable, they need fresh air free from dust, soot, and odours. The air must not be too warm or too cool, and it must have the right amount of moisture.

Even if the air in a room is fresh to begin with, important changes take place when people come into the room. The air becomes warmer because the human body gives off heat. The amount of moisture in the air increases because of the water vapour given off as people breathe and perspire. Also, the air becomes stale because of perspiration and the oily matter given off from people's skins, noses, throats, and clothing. Smoking especially makes the air stale.

People remove the gas oxygen from the air they inhale, and give off another gas, called *carbon dioxide,* to the air they exhale. Although breathing increases the carbon dioxide and decreases the oxygen in a room, these changes are normally too small to affect health.

The more people there are in a room, or the harder they work, the faster the air becomes stale. If the air outside is fresh, simply opening a window and perhaps turning on a fan will ventilate the room. However, if the outside air is not fresh or the room is on the inside of a building, special equipment is needed to clean the air, cool or heat it, and remove or add moisture. This equipment is called *air conditioning* (see **Air conditioning**).

See also **Humidity; Air cleaner.**

Ventricle. See **Heart.**

AP/Wide World

Ventriloquist Edgar Bergen gained fame on radio and in the cinema in the mid-1900's. He performed with his dummy Charlie McCarthy, *above,* who wore a dress suit and a monocle.

Ventriloquism is the illusion of making the voice appear to come from somewhere other than its source. It takes long and steady practice to develop the ability to imitate near and distant sounds. The sounds are produced in the usual method, but the lips are held as nearly motionless as possible. The tongue is drawn well back and only the tip is moved. A deep breath is taken in and exhaled very slowly. Sounds are modified, or changed, by the muscles of the throat and the palate. The ventriloquist often changes consonants to avoid moving the lips. For example, the letter *p* becomes a *k,* and *b* is quickly slurred into a *g* or *k.* Lack of facial expression by the performer helps to fool the audience. The performer also constantly directs the attention of the audience to the place from which the sound is supposed to come. Theatrical ventriloquists often use a *dummy* or a puppet with whom they pretend to carry on a conversation (see **Puppet** [Dummies]).

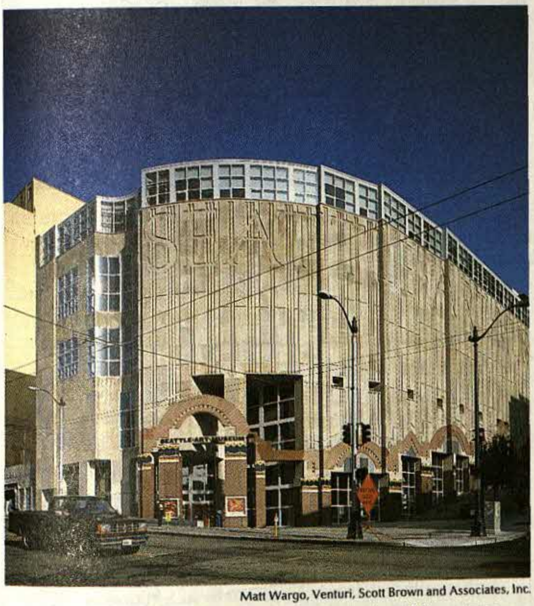
Ventriloquism is an ancient art. The Greeks thought it was the work of demons. They believed the voice came from the abdominal region. The word ventriloquism comes from the Latin *venter,* meaning *belly,* and *loqui,* meaning *to speak.* During the 1700's and 1800's, ventriloquism emerged as a form of entertainment. Today, it is also recognized as an art.

Ventris, Michael George Francis (1922-1956), a British architect, solved one of the great mysteries of archaeology. He deciphered *Linear B,* a system of writing used by the ancient Greeks about 3,500 years ago. Inscriptions in Linear B were first found on clay tablets discovered at Knossos, Crete, about 1900. But all efforts to decipher them failed until Ventris, an amateur cryptographer, succeeded in 1953. He proved that Linear B was Greek written in the form of writing used by the Minoans, the people of ancient Crete. As a result, scholars changed their views about the early history of ancient Greece. Ventris was born at Wheathampstead, England.

See also **Greece, Ancient** (History [Beginnings]); **Aegean civilization.**

Venturi, Robert (1925-), is an American architect whose theories and designs helped establish postmodernism as an important architectural movement. Venturi discussed his theories in his influential book *Complexity and Contradiction in Architecture* (1966). Venturi advocated mixing symbols from classical architecture, particularly Italian renaissance and Roman architecture with modern architectural forms and ideas from such *vernacular* (common) buildings as fire stations.

Venturi wrote that he wanted to achieve an architecture of "messy vitality." Venturi wrote a second significant book, *Learning from Las Vegas* (1972), with Steven Izenour and Denise Scott Brown, Venturi's wife. The book criticizes modern American architecture and urban planning through a favourable analysis of the spontaneous commercial architecture of Las Vegas.


Matt Wargo, Venturi, Scott Brown and Associates, Inc.

Venturi's Seattle Art Museum has an exterior of limestone. The windows at ground level are framed in red granite and colourful terracotta tiles. The building opened in 1991.

Venturi was born in Philadelphia. He demonstrated his theories in two early designs in Philadelphia, the Vanna Venturi House (1963) and the Guild House (1965). Critics interpreted the designs as attacks on modern architecture, particularly the works of Frank Lloyd Wright and Mies Van der Rohe. His later projects include the Seattle Art Museum and the Sainsbury Wing of the National Gallery in London (both 1991).

See also **Architecture** (Architecture today).

Venus was a major goddess in Roman mythology. She originally was a protector of gardens. Later, she took on the myths and qualities of Aphrodite, the goddess of fertility, love, and beauty in Greek mythology. Venus symbolized the creative force that sustains all life. Cupid, the Roman god of love, was her son.

Venus was also mother of Aeneas, a Trojan ancestor of the legendary founders of Rome. The Romans worshipped her because of her association with the city's early history. They believed the family of the ruler Julius Caesar descended from Venus through Aeneas.

Venus was born full-grown from the foam of the Mediterranean Sea and came to land on the island of Cyprus. She married Vulcan, the lame and ugly blacksmith god. Venus had a love affair with Mars, the god of war, and she also fell in love with Adonis, a mortal.

Venus plays a part in a famous myth called the *Judgment of Paris.* Venus and the goddesses Juno and Minerva all claimed a golden apple, a prize reserved for the most beautiful goddess. The god Jupiter ordered Paris, the son of King Priam of Troy, to choose the most beautiful of the three. Paris awarded the apple to Venus. In revenge, Juno and Minerva made certain that Troy was destroyed during the Trojan War.

Venus has been a popular subject of painters and sculptors. Many works show her admiring herself in a mirror. Others portray the Judgment of Paris or show Venus with Mars or Adonis.

See also **Aphrodite; Adonis; Paris** (in mythology); **Venus de Milo; Vulcan.**

Venus is known as Earth's "twin" because the two planets are so similar in size. The diameter of Venus is about 12,100 kilometres, approximately 644 kilometres smaller than that of Earth. No other planet comes nearer to Earth than Venus. At its closest approach, it is about 41.4 million kilometres away.

As seen from Earth, Venus is brighter than any other planet or even any star. At certain times of the year, Venus is the first planet or star that can be seen in the western sky in the evening. At other times, it is the last planet or star that can be seen in the eastern sky in the morning. When Venus is near its brightest point, it can be seen in daylight.

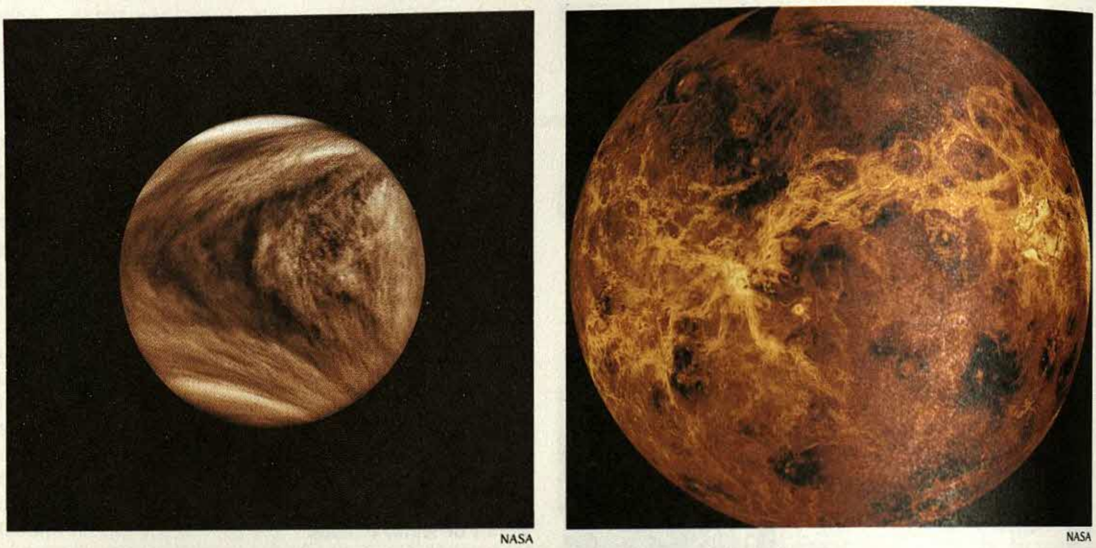
Ancient astronomers called the object that appeared in the morning Phosphorus, and the object that appeared in the evening Hesperus (see **Evening star**). Later, they realized these objects were the same planet. They named Venus in honour of the Roman goddess of love and beauty.

Orbit. Venus is closer to the sun than any other planet except Mercury. Its *mean* (average) distance from the sun is about 108.2 million kilometres, compared with about 150 million kilometres for Earth and about 57.9 million kilometres for Mercury.

Venus travels around the sun in a nearly circular orbit. The planet's distance from the sun varies from about 108.9 million kilometres at its farthest point to about 107.5 million kilometres at its closest point. The orbits of all the other planets are more *elliptical* (oval-shaped). Venus takes about 225 Earth-days, or about 7 $\frac{1}{2}$ months, to go around the sun once, compared with 365 days, or one year, for Earth.

Phases. When viewed through a telescope, Venus can be seen going through "changes" in shape and size. These apparent changes are called *phases,* and they resemble those of the moon. They result from different parts of Venus' sunlit areas being visible from Earth at different times.

As Venus and Earth travel around the sun, Venus can be seen near the opposite side of the sun about every 584 days. At this point, almost all its sunlit area is visible. As Venus moves around the sun toward Earth, its sunlit area appears to decrease and its size seems to increase.


NASA

NASA

Thick clouds of sulphuric acid cover Venus, *left.* But radar waves beamed from space probes have pierced the clouds, providing data that a computer used to construct an image of the planet's surface, *right.* The colours are based on pictures taken by probes that landed on Venus.

After about 221 days, only half the planet is visible. After another 71 days, Venus nears the same side of the sun as Earth, and only a thin sunlit area can be seen.

When Venus is moving toward Earth, the planet can be seen in the early evening. When moving away from Earth, Venus is visible in the early morning.

Rotation. As Venus travels around the sun, it rotates very slowly on its axis, an imaginary line drawn through its centre. Venus' axis is not *perpendicular* (at an angle of 90°) to the planet's path around the sun. The axis tilts at an angle of approximately 178° from the perpendicular position. For an illustration of the tilt of Venus, see **Planet** (The axes of the planets). Unlike Earth, Venus does not rotate in the same direction in which it travels around the sun. Rather, Venus rotates in the *retrograde* (opposite) direction and spins around once every 243 Earth-days.

Surface and atmosphere. Although Venus is called Earth's "twin," its surface conditions appear to be very different from those of Earth. Geologists have had difficulty learning about the surface of Venus because the planet is always surrounded by thick clouds of sulphuric acid. They have used radar, radio astronomy equipment, and space probes to "explore" Venus.

Until recently, much of what geologists knew about the surface of Venus came from ground-based radar observations, the Soviet Union's *Venera* space probes, and United States *Pioneer* probes. In 1990, the U.S. space probe *Magellan* began orbiting Venus, using radar to map the planet's surface.

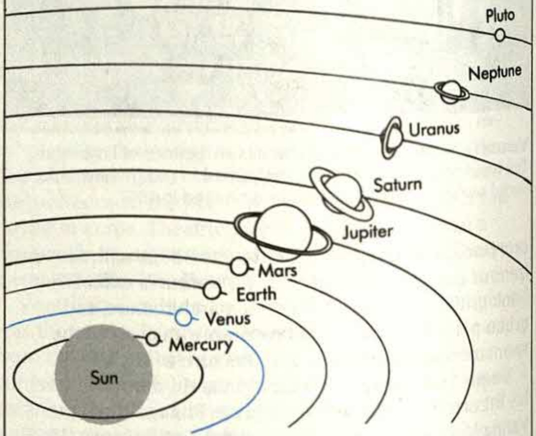
The surface of Venus is extremely hot and dry. There is no liquid water on the planet's surface because the high temperature would cause any liquid to boil away.

Venus has a variety of surface features, including level ground, mountains, canyons, and valleys. About 65 per cent of the surface is covered by flat, smooth plains. On these plains are thousands of volcanoes, ranging from about 0.8 to 240 kilometres in diameter. Six

Venus at a glance

Venus, shown in blue below, is the second closest planet to the sun. Astronomers sometimes use the ancient symbol for Venus, *right.*

♀



Distance from the sun: *Shortest*—107,500,000 km; *Greatest*—108,900,000 km; *Mean*—108,200,000 km.

Distance from Earth: *Shortest*—41,400,000 km; *Greatest*—257,000,000 km.

Diameter: 12,104 km.

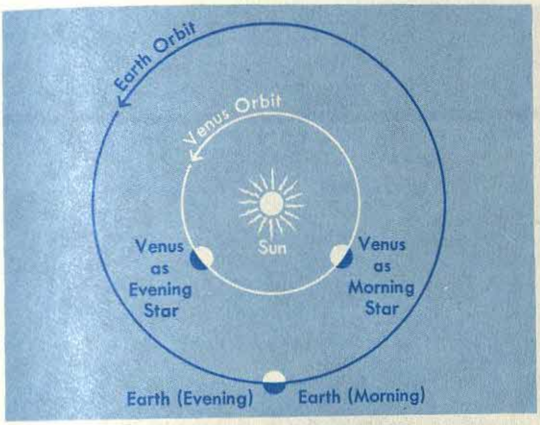
Length of year: 225 Earth-days.

Rotation period: 243 Earth-days.

Temperature: 462 °C.

Atmosphere: Carbon dioxide, nitrogen, water vapour, argon, carbon monoxide, neon, sulphur dioxide.

Number of satellites: None.



Venus appears in the evening sky when moving toward Earth. It is in the morning sky after it has passed between the sun and Earth and begins moving away from Earth.

mountainous regions make up about 35 per cent of the surface of Venus. One mountain range, called *Maxwell,* is about 11.3 kilometres high and about 870 kilometres long. It is the highest feature on the planet. In an area called *Beta Regio* is a canyon that is 1.0 kilometre deep.

There are also *impact craters* on the surface of Venus. Impact craters form when a planet and asteroid collide. The Moon, Mars, and Mercury are covered with impact craters, but Venus has substantially fewer craters. The scarcity of impact craters on Venus has led geologists to conclude that the present surface is less than 1 billion years old.

A number of surface features on Venus are unlike anything on Earth. For example, Venus has *coronae* (crowns), ringlike structures that range from about 155 to 580 kilometres in diameter. Scientists believe that coronae form when hot material inside the planet rises to the surface. Also on Venus are *tesserae* (tiles), raised areas in which many ridges and valleys have formed in different directions.

The atmosphere of Venus is heavier than that of any other planet. It consists primarily of carbon dioxide, with small amounts of nitrogen and water vapour. The planet's atmosphere also contains minute traces of argon, carbon monoxide, neon, and sulphur dioxide. The *atmospheric pressure* (pressure exerted by the weight of the gases) on Venus is estimated at 9,122 kilopascals. This is about 90 times greater than the atmospheric pressure on Earth, which is about 101 kilopascals.

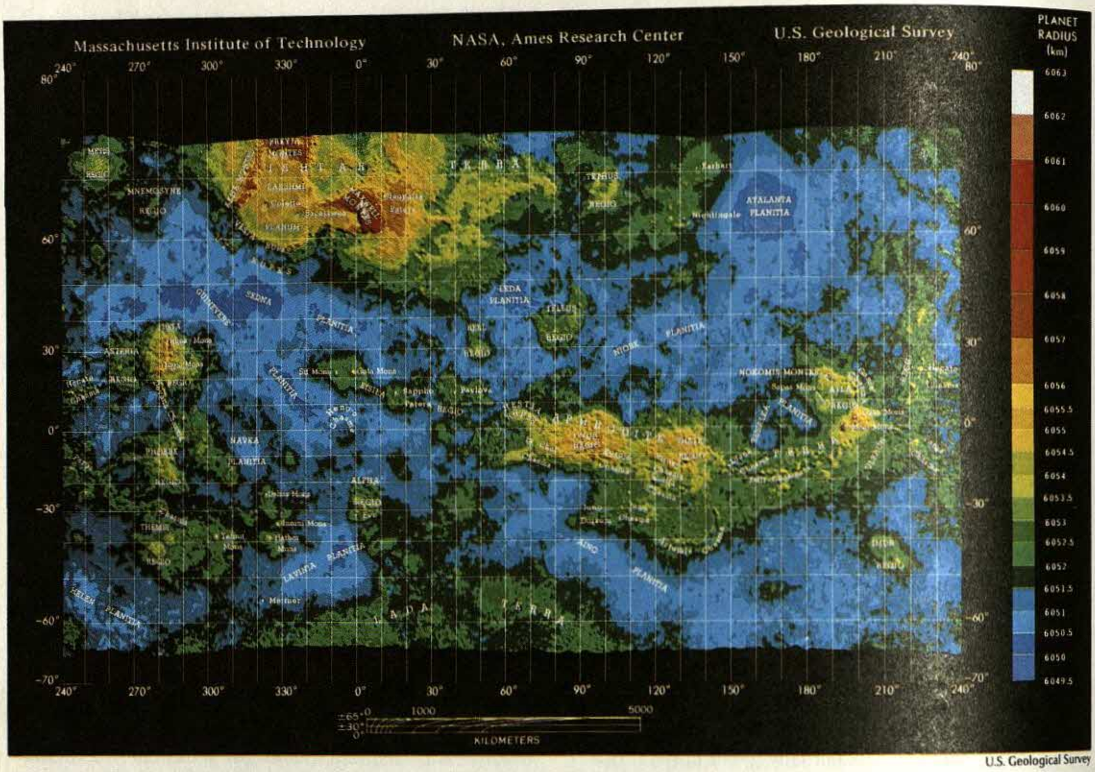
Temperature. The temperature of the uppermost layer of Venus' clouds averages about 13 °C. However, the temperature of the planet's surface is about 462 °C—higher than that of any other planet and hotter than most ovens.

The plants and animals that live on Earth could not live on the surface of Venus, because of the high temperature. Astronomers do not know whether any form of life exists on Venus, but they doubt that it does.

Most astronomers believe that Venus' high surface temperature can be explained by what is known as the *greenhouse effect.* A greenhouse lets in radiant energy from the sun, but it prevents much of the heat from escaping. The thick clouds and dense atmosphere of Venus work in much the same way. The sun's radiant energy readily filters into the planet's atmosphere. But the large droplets of sulphuric acid present in Venus' clouds—and the great quantity of carbon dioxide in the atmosphere—seem to trap much of the solar energy at the planet's surface.

Mass and density. The *mass* of Venus is about four-fifths that of Earth (see **Mass**). The force of gravity on Venus is slightly less than on Earth. For this reason, an object weighing 100 kilograms on Earth would weigh about 88 kilograms on Venus. Venus is also slightly less *dense* than Earth (see **Density**). A portion of Venus

An impact crater on Venus measures about 37 kilometres across the depression in its centre. A computer produced this image in 1991, using information from a radar scan by the U.S. space probe *Magellan.*



U.S. Geological Survey

This map of Venus is based on a radar survey taken by the U.S. *Pioneer Venus 1* space probe. The radius scale, *right,* uses colours to indicate distances from the planet's centre to the top of its surface features. Venus' highest mountain range appears as a red mass at 0° longitude and about 65° north latitude. It rises about 11.3 kilometres above the plains, which appear as blue areas.

would weigh a little less than an equal-sized portion of Earth.

Flights to Venus. Venus was the first planet to be observed by a passing spacecraft. The unmanned U.S. spacecraft *Mariner 2* passed within 34,760 kilometres of Venus on Dec. 14, 1962, after travelling through space for more than 3½ months. It measured various conditions on and near Venus. For example, instruments carried by the spacecraft measured the high temperatures of the planet.

Two unmanned Soviet spacecraft "explored" Venus in 1966. *Venera 2* passed within 24,000 kilometres of the planet on February 27, and *Venera 3* crashed into Venus on March 1.

In October 1967, spacecraft from both the United States and the Soviet Union reached Venus. On October 18, the Soviet spacecraft *Venera 4* dropped a capsule of instruments into Venus' atmosphere by parachute. On October 19, the U.S. spacecraft *Mariner 5* passed within 3,990 kilometres of Venus. It did not detect a magnetic field. Both probes reported large amounts of carbon dioxide in the planet's atmosphere. On Dec. 15, 1970, the Soviet spacecraft *Venera 7* landed on Venus. The U.S. planetary probe *Mariner 10* flew near Venus on Feb. 5, 1974. The probe transmitted the first close-up photographs of the planet.

On Oct. 22, 1975, the unmanned Soviet spacecraft *Venera 9* landed on Venus and provided the first close-up photograph on the planet's surface. Three days later, another Soviet space vehicle, *Venera 10,* reached Venus. It photographed Venus' surface, measured its atmospheric pressure, and determined the composition of rocks on its surface.

Four unmanned spacecraft reached Venus in December 1978. The United States craft *Pioneer Venus 1* began orbiting the planet on December 4. This craft transmitted radar images of Venus, produced a map of its surface, and measured temperatures at the top of the planet's clouds. On December 9, the U.S. *Pioneer Venus 2* entered the planet's atmosphere and measured its density and chemical composition. On December 21, the Soviet craft *Venera 12* landed on Venus. A second Soviet lander, *Venera 11,* reached the planet's surface four days later. Both probes sent back data on the lower atmosphere of Venus.

Two more Soviet spacecraft landed on Venus in 1982—*Venera 13* on March 1 and *Venera 14* on March 5. Both probes transmitted photographs of Venus and analysed soil samples. Beginning in October 1983, two additional Soviet spacecraft mapped the region of Venus north of 30° north latitude using radar. *Venera 15* finished its mapping in July 1984; *Venera 16,* in April 1984. The two probes provided clear images of features as small as 1.5 kilometres across.

The U.S. spacecraft *Magellan* began orbiting Venus on Aug. 10, 1990. Radar images received from the *Magellan* show details of features only 100 metres across.

See also **Planet; Solar system; Space exploration.**

Venus de Milo is a famous ancient Greek statue. The marble sculpture represents Aphrodite, the Greek goddess of love and beauty (Venus in Roman mythology). It stands over 2 metres tall. It was created by an unknown sculptor, perhaps about 130 B.C. The statue has broad hips and breasts in contrast to a fine-boned, serene head. Drapery seems to be slipping off her hips.

The statue was named *Venus de Milo* (*Venus of Milos*) because a peasant found it on the Greek island of Milos in 1820. It was broken into two parts. Other fragments were found, including pieces of arms and a pedestal with an inscription. These later disappeared and have never been recovered. It was one of many statues of Aphrodite inspired by the Aphrodite of Knidos by the Greek sculptor Praxiteles (see **Praxiteles**).

The Marquis de Rivière, French ambassador to Turkey, bought the statue. After it was repaired, he gave it to King Louis XVIII of France. Louis presented the statue to the Louvre museum in Paris, where it is now exhibited.

See also **Paris** (picture: The Venus de Milo).

Venus'-flytrap is a plant found in a small area of the coastal regions of North and South Carolina, in the United States. It is also called *Dionaea.* This plant traps insects in its leaves and digests them. Because of this habit it is called a *carnivorous* (meat-eating) plant. Venus'-flytrap grows in bogs in which the soils lack nitrogen. The insects take the place of nitrogen in the plant's diet. It grows best in a damp atmosphere but needs sunshine.

Runk/Schoenberger from Grant Heilman

Venus'-flytrap

Venus'-flytrap grows about 30 centimetres high. It bears a cluster of small, white blossoms at the top of the flower stalk. The blossoms rise from a tuft of oddly shaped leaves. The leaves have two parts—a lower bladelike portion and an upper part with two lobes hinged to a rib. The surface of each lobe has three sensitive hairs, and the edges of each lobe are fringed with sharp bristles. When an insect lights on one of these hairs, the two lobes close like a trap and hold the insect inside.

The soft parts of the insect are digested by a fluid that is secreted by special glands of the leaf. After the plant has taken in the food, the trap opens, and the leaf is in position to capture another victim. When a leaf has caught several insects, it withers and dies.

See also **Insectivorous plant.**

Scientific classification. Venus'-flytrap is in the family Droseraceae. It is *Dionaea muscipula.*

Venus'-girdle. See **Ctenophore.**

Veracruz (pop. 328,607) is the chief port of Mexico. Its official name is Veracruz Llave. The city overlooks a harbour on the Gulf of Mexico, 320 kilometres east of Mexico City. Its products include chocolate, cigars, shoes, and textiles. Veracruz is a railway centre. The city is the site of the fortress of San Juan de Ulúa, built by the Spanish in the 1500's. For the location of Vera Cruz, see **Mexico** (political map).

Hernando Cortés founded Veracruz in 1519 (see **Cortés, Hernando**). The city was the first Spanish settlement in Mexico. United States Marines occupied Veracruz for a time in 1914, after a dispute with Mexico over the arrest of some U.S. sailors.

Verb is a part of speech that expresses an action or a state of being. A verb may consist of one word, such as *send,* or a group of words, such as *has been sending.* Every sentence must include a verb. Verbs occupy characteristic positions in a sentence. For example, only a verb makes sense in the blank spaces in the following sentences:

She ____________ the letter. (sent, began)
He ____________ my father. (is, answered)
We ____________ immediately. (went, arrived)
Did they ____________? (go, begin)

Formal characteristics of verbs can be illustrated by the forms of the verb *fall.* These forms are *fall, falls, fell, fallen,* and *falling. Fall* is the base form, or infinitive, with or without the preceding particle *to. Fall* is also the form of the first and second person singular and plural, as in *I fall, you fall, we fall. Falls* is the form of the third person singular, used with a noun or a pronoun subject. *Fell* is the past tense form. *Fallen* is the past participle. It is used after an auxiliary verb, such as *be* and its forms (*am, is, are, was,* and *were*). It is used alone when the verb is used as a modifier, as in Fallen *leaves covered it. Falling* is the present participle, used as a modifier, as in *The* falling *snow blinded him,* and after forms of *be,* as in *He was* falling.

Auxiliary verbs, such as *can, may, should, might,* and *must,* do not have the same characteristics as other verbs. They are usually followed by the base form of a verb, as in *John* can *go but Peter* must *stay.* The verbs *do, be,* and *have* serve a double function. They may be used as independent verbs *(He has it)* and also as auxiliary verbs *(She has tried).*

Regular and irregular verbs are classified according to the way they form the past tense and past participle. A verb's base form, past tense form, and past participle are called its *principal parts.*

Most English verbs are regular. The past tense form and the past participle of a regular verb are created by adding *-ed* to the base form, as in *happen, happened, happened.* The principal parts of all verbs of recent origin are formed by adding *-ed* to the base form, as in *computerize, computerized, computerized.*

Irregular verbs change in other ways to form the past tense and past participle. One kind of irregular verb changes in the past tense and then keeps that same form in the past participle. Examples include *feed, fed, fed;* and *win, won, won.* Another kind adds an *-n* or *-en* to the base form or to the past tense form to make the past participle. Examples include *know, knew, known;* and *speak, spoke, spoken.* Other verbs have irregular changes in spelling for each principal part, as in *slay, slew, slain.* Still others use the same form for all principal parts. They include *cost, cut, set,* and *shut.* These verbs are called *invariables.*

A large group of irregular verbs shows a change of vowel in both the past tense and past participle: *begin, began, begun; ring, rang, rung; swim, swam, swum.* Through usage, many verbs of this type are gradually changing into regular verbs with *-ed* endings. For example, the verb *strive* has the irregular forms *strive, strove, striven* and also has the regular forms *strive, strived, strived.*

Transitive and intransitive verbs. Verbs may be classified as either transitive or intransitive. A transitive verb has an object, as in *He found the money.* The object of *found* is *money.* An intransitive verb has no object, as in *She is speaking.* Many verbs may be transitive in one sentence and intransitive in another. For example, *The chorus sang a popular song* (transitive); *The chorus sang well* (intransitive).

Linking, or copulative, verbs occur in two general structures. In one, the verb is followed by an adjective, as in *He is good* or *It smelt good.* Verbs such as *seemed, looked, tasted, smelt, became, sounded, turned,* and various others can be used as linking verbs. Some occur only in limited contexts, as in *The text* ran *short.* In the other linking-verb structure, a noun following the verb refers to the subject, as in *She* is *my mother; He* became *mayor;* and *She* seemed *an interesting person.*

Finite and nonfinite verbs. A finite verb, together with a subject, can form a grammatically complete sentence: *She drives; She is driving.* A nonfinite verb, or *verbal,* is derived from a verb but acts as another part of speech. There are three forms of verbals: *gerunds, participles,* and *infinitives.* A gerund is used as a noun: Swimming *is fun.* Participles serve as adjectives: *Susan held the* winning *ticket.* Infinitives can be used as nouns, adjectives, or adverbs. In the sentence *To run a mile is difficult,* the infinitive *to run* serves as a noun. In the sentence *I have reading to do,* the infinitive *to do* is used as an adjective. In the sentence *Alice practised to become a better singer,* the infinitive *to become* serves as an adverb.

Nonstandard usage of verbs involves the use of verb forms that are not suited to the rest of a sentence. Such usage occurs mainly in two ways. One way consists of dropping a standard verb ending: *He fall* instead of *He falls.* The other common nonstandard practice involves using an inappropriate principal part: *I seen it* instead of *I saw it.*

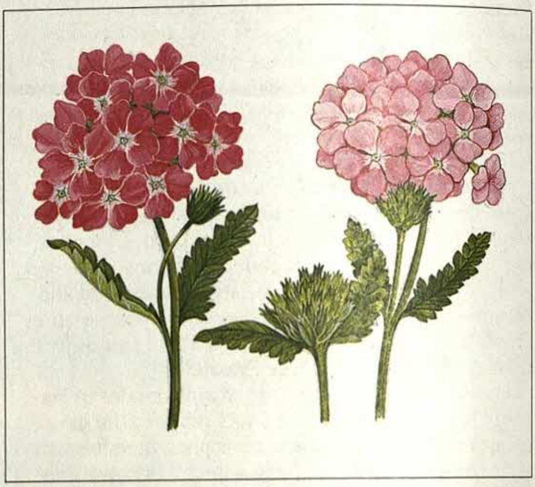
Related articles in *World Book* include:

Conjugation
Gerund
Infinitive
Inflection
Mood
Number
Participle
Person
Sentence
Tense
Voice

Verbal. See **Gerund; Participle; Infinitive.**

Verbena is the name of a large group of plants, almost all of which are native to North America and South America. Most wild verbenas grow in tropical and subtropical regions. A few species of verbenas are cultivated. In temperate regions, they are grown mainly as bedding plants and in hanging baskets.

Most wild verbena have spikes of small flowers that are not very showy. A common European species, known as *vervain,* was once thought to be an effective remedy for blockages in the bladder and bowel, vision disorders, and many other ailments. Several other species of wild verbena are also called vervain. Cultivated verbenas have clusters of showy flowers in a great variety of colours, including pink, red, white, and purple. The flowers of all verbenas have a tubelike shape, and they flare into five petals at the tip.



The garden verbena produces clusters of fragrant flowers on a slender stem. The blossoms of the verbena may be red, pink, or other colours.

Verbenas are best cultivated in a fertile soil in a sunny position. To encourage bushy growth, the leading shoot of the young plant should be pinched out.

Scientific classification. Verbenas belong to the vervain family, Verbenaceae. The European vervain is *Verbena officinalis.* The most commonly cultivated variety is *Verbena hybrida.*

Verdi, Giuseppe (1813-1901), was an Italian composer of operas. His works are performed more often today than those of any other opera composer. Between 1851 and 1871, Verdi produced a remarkable series of masterpieces, including *Rigoletto* (1851), *Il Trovatore* (1853), *La Traviata* (1853), *The Sicilian Vespers* (1855), *Simon Boccanegra* (1857, revised 1881), *A Masked Ball* (1859), *La Forza del Destino* (1862), *Don Carlos* (1867), and *Aida* (1871). Verdi wrote 26 operas. He composed all to Italian *librettos* (texts) except the *Sicilian Vespers* and *Don Carlos,* which he wrote to French librettos.

Verdi gained fame for his mastery of theatrical effect and for the stirring melodic quality of his operas. He took several of his plots from the plays of such great dramatists as Victor Hugo, Friedrich Schiller, and William Shakespeare. Verdi wrote many melodies for soloists and small groups of singers. His operatic choruses remain familiar throughout the world.

Verdi, a fiery Italian patriot, became a symbol of Italy's struggle for independence from Austria during the mid-1800's. He had frequent conflicts with Austrian authorities, who felt that his operas encouraged Italian nationalism. Much of the music of his early operas, particularly of *Nabucco* (1842) and *I Lombardi* (1843), became identified with the Italian nationalist movement.

Verdi was born in Le Roncole, near Parma. He studied music as a boy in Busseto, a nearby town. He tried to enter the Milan Conservatory in 1832 but was rejected because he was too old and lacked sufficient formal training. He began taking private music lessons in Milan.

In 1839, Verdi's first opera, *Oberto,* was a success at its première at La Scala, the leading opera house in Milan. Between 1838 and 1840, his first wife and two small children died. The grief-stricken composer finished a comic opera, *Un Giorno di Regno,* which was a failure when presented in 1840. But his third opera, *Nabucco,* made him the foremost Italian composer of his time. After completing *Aida* in 1871, Verdi apparently decided to end his career because of illness and age. During the next 16 years, his only important composition was a *Requiem Mass* (1874), written in memory of the Italian author Alessandro Manzoni.

Verdi returned to opera composing in the mid-1880's through the urging of his friend Arrigo Boito, a noted Italian poet and composer. Boito contributed librettos for Verdi's *Otello* (1887) and *Falstaff* (1893). Many critics have called *Otello* Verdi's greatest tragic opera, and some consider it the greatest of all Italian operas. *Falstaff* was only Verdi's second comic opera, but it ranks as one of the greatest comic operas ever written.

Verdi's only works after *Falstaff* were four beautiful religious compositions for voices called *Quattro Pezzi Sacri* (1898). A period of national mourning was declared in Italy following Verdi's death. *The Complete Operas of Verdi* (1970) by Charles Osborne analyses the historical, literary, and musical elements of the operas composed by Verdi.

See also **Opera** (Giuseppe Verdi); **Boito, Arrigo.**

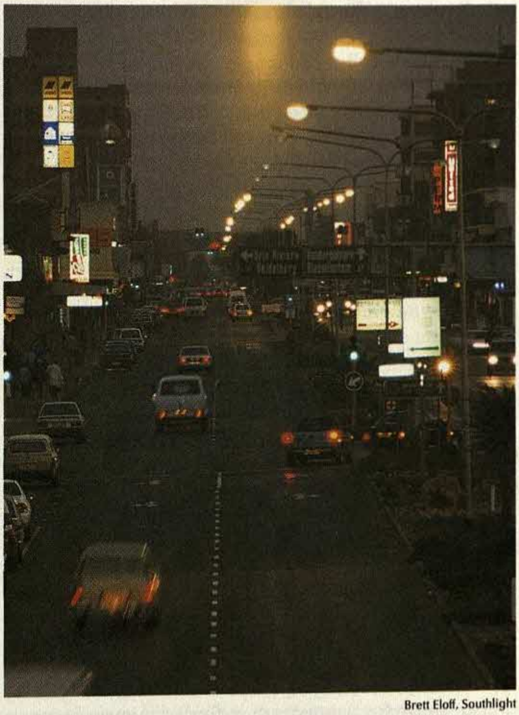
Verdun, Battles of. Verdun, one of the oldest cities of France, has been a battleground since Attila the Hun ravaged it in A.D. 450. This city on the Meuse River in northern France is about 80 kilometres from the German border. It has often played a key role in resisting enemy invasion.

The most famous battle occurred during World War I. On Feb. 21, 1916, German troops launched a surprise attack. The Germans believed that the French would defend Verdun to the last person. Germany hoped that French losses would be so great that France would drop out of the war. Even if France continued to fight, the Germans thought that French forces would be too weak to fight effectively. The French, led by General Henri Pétain, defended the area stubbornly. After 11 months, the Germans withdrew, and the French hailed Pétain as a hero (see **Pétain, Henri P.**).

During World War II (1939-1945), German forces easily captured Verdun in 1940, and United States forces recaptured the city in 1944.

Verdun, Treaty of, divided Charlemagne's empire into three parts. Charlemagne's grandsons fought over control of the empire after their father died in 840, and finally signed the treaty in 843. Charles the Bald received most of what is now France. Louis the German took almost all the land east of the Rhine, which became modern Germany. Lothair kept the title of emperor, and ruled a strip of land in the middle, from the North Sea to central Italy.

As a result of the treaty, the lands that became France and Germany were divided. The section in between remained a battleground for a thousand years. Italy soon fell away from Lothair's kingdom. In later years, part of his kingdom became known as *Lotharingia,* or, later, Lorraine. The partition agreed upon at Verdun marked the end of the political unity of the Christian countries of western Europe.



Brett Eloff, Southlight

Voortrekker Avenue is a main street in Vereeniging, an important industrial town in South Africa's Gauteng province.

Vereeniging (pop. 60,680) is an important industrial town in Gauteng province in South Africa. The name Gauteng was introduced in 1994 to replace PWV (Pretoria-Witwatersrand-Vereeniging). Vereeniging is situated on the Vaal, about 60 kilometres south of Johannesburg. For location, see **South Africa** (political map).

Gauteng is the largest urban industrial complex in Africa. Iron and steel works were established in Vereeniging in 1911, and power stations in 1913. Heavy steel manufacture and power generation from local coal are the main industries.

In 1880, George Stow discovered coal deposits in the area. This led to the formation of a company called *De Zuid Afrikaansche en Oranje Vrystaatsche Koelen en Mineralen Mijn Vereeniging,* which gave the town its name. *Vereeniging* is the Dutch word for *company.*

Vérendrye, Sieur de la. See **La Vérendrye, Sieur de.**

Verga, Giovanni (1840-1922), was an Italian novelist, playwright, and short-story writer. His style—dry, matter-of-fact, and impersonal, yet highly effective—influenced many later Italian writers.

Verga was born in Catania, Sicily, and his best work deals with Sicily and its people. In *The House by the Medlar Tree* (1881), Verga described the struggle of a Sicilian fishing family to keep their home and integrity despite tragedy and disaster. Verga planned it as the first of five novels describing people's unsuccessful efforts to improve their lives. The project ended with the second novel, *Mastro Don Gesualdo* (1889).

Verga's literary success began in 1866 with the publication of the first of several romantic novels of middle-class life. He also wrote several short stories set in Sicily. His collection *Life in the Fields* (1880) includes "Cavalleria Rusticana." This tale became the basis of an opera by Pietro Mascagni.

Vergil. See **Virgil.**

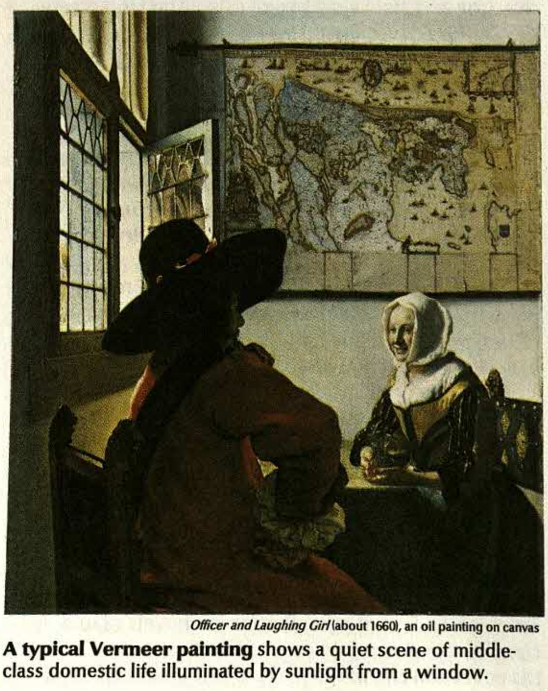
Verlaine, Paul (1844-1896), was a French poet born in Metz. He began his career with *Fêtes Galantes* (1869), impressionistic sonnets inspired by the paintings of Antoine Watteau. Verlaine's short poem "Art Poétique" (1871-1873) expressed the spirit of the symbolist movement. In it, he claimed that the suggestive power of music was the essential quality of poetry. See **Symbolism.**

Verlaine travelled through Great Britain, the Netherlands, and Belgium with the teenage poet Arthur Rimbaud in the early 1870's. Verlaine described the landscapes in dream imagery in *Romances sans Paroles* (*Songs Without Words,* 1874). The friendship ended in 1874 when Verlaine shot and wounded Rimbaud during a quarrel. After Verlaine served a brief prison term for the shooting, he wrote *Sagesse* (*Wisdom,* 1881), poems of self-searching and religious repentance.

Verlaine's many spontaneous and melodious verses—with their images of grey skies, pale moons, and weeping violins—create a melancholy mood.

See also **Rimbaud, Arthur.**

Vermeer, Jan (1632-1675), was a Dutch painter. He was especially skilled at painting simply furnished domestic interiors in which young, middle-class men and women talk, drink, or play musical instruments. Vermeer is also known for paintings of individual female figures quietly performing simple tasks before a mirror or a window, such as reading a letter or holding a pitcher. He placed his figures close to the viewer in relatively simplified composition. Many of his subjects appear caught in tranquil moments of concentration. Vermeer's *Young Woman with a Water Jug* appears in the **Painting** article.



Officer and Laughing Girl (about 1660), an oil painting on canvas

A typical Vermeer painting shows a quiet scene of middle-class domestic life illuminated by sunlight from a window.

Vermeer employed the *pointillist* or *stippling* method of painting. In this method, the painter uses small dots or points of unmixed colour that blend in the eye of the viewer. In paintings such as *The Lacemaker* and *The Milk Maid,* Vermeer used this technique to suggest the illusion of soft light playing fleetingly over the textures of surfaces. Vermeer's conception of soft light results in slightly blurred outlines.

Vermeer's two outdoor scenes, *The View of Delft* and *Street in Delft,* rank among the finest landscape paintings of the 1600's. Vermeer was born in Delft. He spent his entire life there, working mainly as an art dealer and innkeeper.

Vermicelli. See **Pasta.**

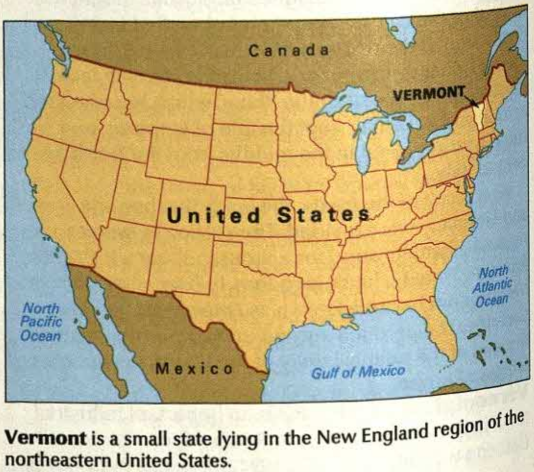
Vermiculite is a mineral that occurs as layered flakes. It resembles the mineral *mica* (see **Mica**). Vermiculite consists mainly of the chemical elements aluminium, iron, magnesium, oxygen, and silicon. It may be brown or yellow.

When expanded by heat, vermiculite becomes a lightweight, fireproof substance with good heat insulating properties. It is used chiefly in building materials for insulation and soundproofing. It is also used as a soil conditioner and potting material. The United States produces and consumes more vermiculite than any other nation.

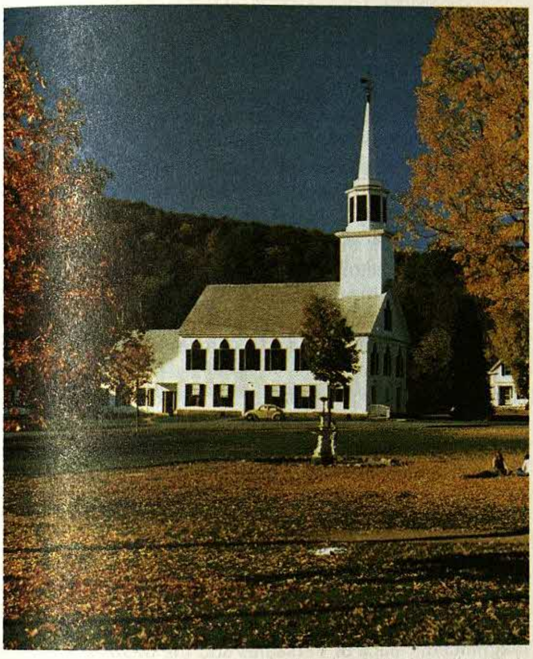
Vermilion is a pigment or colouring matter used in making paint. The colour of vermilion varies from crimson to a brilliant yellow-red. Formerly made from the mineral cinnabar, vermilion is now made from mercury and sulphur ground together and treated with caustic-potash solution. This may be heated and stirred to form a black sulphide which yields the pigment, after long steaming. The name *vermilion* comes from a Latin word that means *little worm,* and refers to the dried bodies of insects from which carmine, another red dye, is obtained.

See also **Cinnabar.**

Vermont (pop. 564,964) is a state in New England, United States. It is one of the smallest U.S. states. Only Alaska and Wyoming have fewer people. About two-thirds of Vermont's people live in rural areas—a greater percentage than in any other state. Burlington is the largest city and Rutland is second largest. Montpelier is the state capital.



Vermont is a small state lying in the New England region of the northeastern United States.



Vermont is noted for the beauty of its autumn scenery.

Land. Vermont covers 24,900 square kilometres. The tree-covered Green Mountains run the entire length of central Vermont. The name *Vermont* comes from *Vert Mont,* the French words for *Green Mountain.* Vermont's nickname is the *Green Mountain State.* The mountains attract thousands of skiers and other tourists. Mount Mansfield, the highest peak, rises 1,339 metres above sea level. In addition to the Green Mountains, Vermont has many other mountainous and hilly areas.

Water forms more than half the state borders. The Connecticut River forms Vermont's entire eastern border. Lake Champlain extends along the northern half of the western border.

Summers in Vermont are short, with few hot days. The average July temperature is 20° C. Vermont winters are long and cold, with an average January temperature of −8° C.

Economy. Manufacturing is the single most important economic activity in the state. The production of electronic goods, including computer machinery and components, is the leading manufacturing activity by far.

Service industries employ about two-thirds of Vermont's workers. They include education, finance, health care, and trade.

Milk is Vermont's most important farm product. Granite is the leading mineral product.

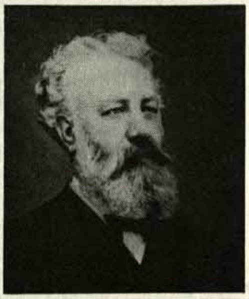
History. Vermont was chiefly an Indian hunting ground before white settlers arrived in the 1700's. England controlled the region until the American Revolution (1775-1783). Early in the war, Vermont soldiers called the *Green Mountain Boys* captured Fort Ticonderga, on Lake Champlain in New York, from the British. Vermont became a U.S. state in 1791.

During the early 1900's, manufacturing replaced agriculture as Vermont's most important economic activity. The state's tourist industry also grew rapidly. A number of disputes arose during the 1980's between people who favour economic development and those who view it as a threat to the state's rural beauty.

Vernal equinox. See Equinox.

Verne, Jules (1828-1905), a French novelist, wrote some of the first science-fiction stories. Although his books were written before the invention of the aeroplane, they have remained popular in the space age. Verne forecast the invention of aeroplanes, submarines, television, guided missiles, and space satellites. Verne even predicted their uses accurately.

Verne cleverly used realistic detail and believable explanations to support incredible tales of adventure. His fantastic plots took advantage of the widespread interest in science in the 1800's. He carried his readers all over the earth, under it, and above it. Verne's *Twenty Thousand Leagues Under the Sea,* published in 1870, tells about Captain Nemo, a mad sea captain who cruises beneath the oceans in a submarine. In *Around the World in Eighty Days* (1873), Phileas Fogg travels around the earth in the then unheard-of time of 80 days, just to win a bet. Other thrillers include *A Journey to the Centre of the Earth* (1864), *From the Earth to the Moon* (1865), and *Around the Moon* (1870).



Jules Verne

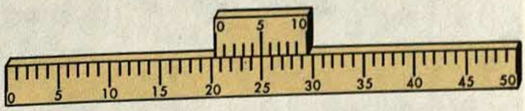
Verne knew a great deal about geography, and used his knowledge to make his stories realistic. He also wrote several historical novels, including a story about the American Civil War, *North Against South* (1887).

Verne was born in Nantes. He studied law in Paris but decided to become a writer. His first works were plays and the words for operas. Verne's first novel, *Five Weeks in a Balloon* (1863), brought him immediate success. It was based on an essay he wrote describing the exploration of Africa in a balloon. The essay was rejected several times before one publisher suggested that Verne rewrite it as a novel of imagination. The popularity of the book encouraged Verne to continue writing on science-fiction themes.

Vernier is an instrument used in measuring lengths and angles. It is named after Pierre Vernier, a French mathematician who invented it during the 1600's.

The most common vernier has a short graduated scale, or "ruler," which slides along a longer scale. The subdivisions on the short rule are nine-tenths as long as the subdivisions on the long scale. Nine small divisions on the large scale are equal to 10 on the small scale.

In using the vernier, the large scale is laid along the material to be measured, a small pipe, for example. The



The vernier scale measures lengths and angles.

small scale is slid until it reaches the end of the pipe. Now we check to see which of its divisions lines up with one of the divisions on the large scale. Suppose the 5, or fifth division from the zero end of the small scale, lines up with 25 on the large scale. Since each division on the small scale is one-tenth smaller than the large divisions, five divisions are equal to only four and one-half on the large scale. Therefore, the end of the small scale rests at 25—4.5, or 20.5 on the large scale.

Engineers often use callipers with a vernier attachment (see **Calliper**). Some read 0.025 millimetre without a magnifier. The setting circles on astronomical telescopes are often equipped with verniers and magnifying devices, allowing a very accurate reading of the position of the celestial object under observation.

Vernier, Pierre. See **Vernier.**

Veronese, Paolo (1528-1588), painted in and around Venice at the end of the Italian Renaissance. His real name was Paolo Cagliari, but he was called Veronese because he was born in Verona. His art is typically Venetian in its dependence on the poetic effects of colour. Veronese became most popular for paintings of historical subjects and myths, and for representations of the life of Venetian aristocrats. He also painted religious subjects and portraits. His figures are robust and handsome, splendidly costumed, and theatrically posed in rich settings. His major works include *Marriage at Cana* in the Louvre in Paris; *Mars and Venus* in the Metropolitan Museum of Art, New York City; and frescoes in the Villa Maser, near Venice.

Veronica, Saint, is traditionally supposed to have been one of the women of Jerusalem who followed Jesus on His way to Calvary. She is said to have offered Christ her linen veil to wipe the sweat from His face. Apocryphal traditions record that the imprint of His features remained on the cloth, and such a miraculous relic is said to have been preserved in Rome and in other cities. Veronica's feast day is celebrated on July 12.

Verrazano, Giovanni da (1485?-1528?), an Italian navigator in the service of France, sailed to North America in 1524. On the voyage, he sought the Northwest Passage to China. He did not find the passage. But he explored the eastern coast of North America from the Carolinas to Newfoundland. Verrazano later made two more voyages to the New World. Historians believe that during the second of these voyages, he was killed by Indians in the Caribbean region. Verrazano was born near Florence. See also **Great-circle route.**

Verrocchio, Andrea del (about 1435-1488), was an Italian sculptor and painter. One of his early great works is a standing figure of David with the head of Goliath at his feet. The work shows how Verrocchio used his knowledge of anatomy to enrich the meaning of his subject. The bronze group, *Christ and St. Thomas,* demonstrates the artist's mastery of psychology in the hesitancy of St. Thomas' stride and gesture in contrast to the calm and poise of Christ.

Verrocchio's large bronze of Bartolommeo Colleoni is sometimes called the world's finest *equestrian statue* (statue of a man on a horse). It appears in colour in the **Sculpture** article. His one unquestioned painting, *The Baptism of Christ,* appears in the **John the Baptist** article. The angel on the left was probably painted by his pupil Leonardo da Vinci.

Versailles (pop. 91,494) is a city in northern France. It lies about 18 kilometres southwest of Paris (see **France** [political map]). Versailles is best known as the site of the magnificent Palace of Versailles and the beautiful grounds around it. The palace was built by King Louis XIV during the 1600's and was the royal residence for more than 100 years. It is now a national museum.

The palace stands in the western part of Versailles. It is about half a kilometre long and has about 1,300 rooms. Many of the rooms have been restored and refurnished to look as they did when royalty lived in them. The palace also has paintings and sculptures by famous European artists.

Many visitors enjoy seeing the bedrooms of the king and queen, the Hall of Mirrors, and the Salon d'Hercule (Room of Hercules). The bedrooms are trimmed with gold-covered wood and furnished with rare antiques. The Hall of Mirrors is a long corridor named after the large mirrors that face each of its windows. The Salon d'Hercule has a high ceiling of about 318 square metres.

The Palace of Versailles and its grounds make up one of the most beautiful sights in France. The palace was built during the 1600's as the royal residence of France, but today it is a museum. The building has about 1,300 rooms, many of which have been restored and refurnished.

The ceiling is decorated by a painting of a scene from the life of Hercules, a hero of Greek mythology.

The palace grounds consist of a garden and a park, which cover about 100 hectares. In the garden, plants are arranged in colourful geometric patterns around fountains and pools. The park includes two small palaces called the Grand Trianon and the Petit Trianon. The Grand Trianon was built by King Louis XIV, who went there to escape the activity of the main palace. Louis XV erected the Petit Trianon. It became the favourite residence of Marie Antoinette, the wife of Louis XVI.

Versailles was originally the site of a hunting lodge built in 1624 by Louis XIII. After he died, his son, Louis XIV, ordered that a palace be constructed on the same site. Work began in 1661 under the direction of Louis Le Vau, a French architect. The palace took more than 40 years to complete. Over the years, later kings added more rooms to the building.

The French Revolution of 1789-1799 led to the overthrow of the French king. Mobs invaded the palace during the revolution and removed or destroyed most of the furniture and art. Little was done to maintain the building until the early 1900's, when restoration work began. This project is still going on.

See also **France** (picture: Historic French furniture); **Fountain** (picture: A fountain at the Palace of Versailles).

Versailles, Treaty of, officially ended military actions against Germany in World War I. The treaty was signed at the Palace of Versailles, near Paris, on June 28, 1919, and went into effect on Jan. 10, 1920. Actual combat had ended when Germany accepted an armistice on Nov. 11, 1918.

The Treaty of Versailles provided an official peace between Germany and nearly all of the 32 victorious Allied and associated nations, including France, Great Britain, Italy, and Japan. China never signed the treaty. The United States would make a separate peace with Germany in 1921 because the U.S. Senate did not ratify the Treaty of Versailles.

The treaty provided a reorganization of the boundaries and certain territories of European nations and areas they controlled in Africa, Asia, and Pacific Ocean islands. It also created several new international organizations, including the League of Nations and the Permanent Court of International Justice. In addition, the treaty provided a system for administering the former colonies of the defeated countries.

The main roles in drafting the treaty were played by President Woodrow Wilson of the United States, Prime Minister David Lloyd George of Great Britain, Premier Georges Clemenceau of France, and Premier Vittorio Orlando of Italy. These men were called the Big Four.

Background of the treaty. Preparations for peace began well before the armistice. Beginning in 1915, a number of the Allied governments, including Italy and Japan, adopted secret treaties intended to divide among them certain parts of Germany, the Ottoman Empire (now Turkey), and other enemies in the war. German colonial territories in Africa, Asia, and the Pacific Ocean also were to be annexed. Italy joined the Allied war effort as a result of such promises.

President Wilson presented his ideas for peace in his famous Fourteen Points address on Jan. 8, 1918. He opposed carrying out terms of any secret treaties. He was in favour of applying the principle of *ethnic self-determination,* under which no ethnic group would have to be governed by a nation or state that it opposed. Wilson also called for moderate punishment, both economic and territorial, for Germany. He believed this approach would encourage Germany to establish a democratic government, to help rebuild Europe, and to refrain from waging war in the future out of bitterness. See **World War I** (The Fourteen Points).

Wilson's chief goal was to have the treaty provide for the formation of a League of Nations (see **League of Nations**). He hoped that the threat of economic or military punishment from League members, including Germany, would prevent future wars. The other major Allies, however, had little interest in honouring either Wilson's Fourteen Points or all his goals for the League of Nations. Clemenceau sought to cripple Germany economically, militarily, and territorially. He also sought additional security against any future German aggression through creation of special military alliances with Britain and the United States. Lloyd George wanted to leave Germany with enough resources for trade, but not enough for waging war. Other Allies, especially Italy and Japan, were chiefly concerned with obtaining more land.

Provisions. The main provisions set up the League of Nations, revised boundaries, disarmed Germany, and called for *reparations.* Reparations consisted of money and other resources Germany would have to give the Allies for severe losses they suffered in the war.

To win support for certain changes concerning the League of Nations, Wilson compromised on the ideals he had set forth in the Fourteen Points. For example, he accepted terms made in secret treaties. Thus, Italy received the South Tyrol region of Austria-Hungary, and Japan obtained German colonies in the North Pacific Ocean and German holdings in China's Shandong province. Wilson also compromised on reparations, agreeing to much more than Germany could afford. Germany had to give the Allies coal, livestock, ships, timber, and other resources, plus cash payments.

Germany lost all its overseas colonies. From its homeland, Germany lost the provinces of Alsace and Lorraine to France, small areas of Eupen and Malmédy to Belgium, and another small border area near Troppau (now Opava) to Czechoslovakia. As a result of a *plebiscite* (popular vote), Germany also lost Northern Schleswig to Denmark. France gained possession of the coal mines in Germany's Saar region for 15 years. Danzig (now Gdańsk, Poland) was taken from Germany and became a "free city" under protection of the League of Nations. Poland gained most of West Prussia and much of the province of Posen (now Poznan). Germany's Rhineland was to be demilitarized. But the Allies were to occupy parts of it for 15 years. See **Europe** (Between world wars; maps).

Ratification. In early May 1919, the treaty was presented to Germany. German officials strongly objected, but had to accept the terms and sign the treaty. The treaty was ratified by Germany's new republican government and all the major Allied powers except China and the United States. It took effect early in 1920.

Strong opposition to the treaty developed in the United States. Many Americans disagreed with Wilson's generous approach to the war-torn nations of Europe. Republicans particularly objected to U.S. commitments to the League of Nations. In March 1920, the U.S. Senate refused to approve the treaty. The United States never joined the League of Nations or the Permanent Court of International Justice. In August 1921, however, Germany and the United States concluded a separate peace in the Treaty of Berlin.

Effects of the treaty. The lost land and huge reparations greatly angered many Germans, who also felt bitter about a "war guilt" clause in the treaty that declared Germany solely responsible for the war. These factors may have contributed to the rise of German dictator Adolf Hitler and his Nazi Party during the 1930's.

See also **World War II** (The Peace of Paris).

Vertebra. See **Spine.**

Vertebrate is an animal with a *spinal column* (backbone) and a *cranium* (brain case). There are about 40,000 species of vertebrates. They may be divided into eight classes: (1) hagfishes (Myxini); (2) lampreys (Cephalaspidomorphi); (3) sharks and other cartilaginous fish (Chondrichthyes); (4) bony fish (Osteichthyes); (5) frogs and other amphibians (Amphibia); (6) reptiles (Reptilia); (7) birds (Aves); and (8) mammals (Mammalia).

Most vertebrates have a spinal column made of bones called *vertebrae* (see **Spine**). But some, such as the shark, do not have a bony spinal column. Sharks have vertebrae made of *cartilage* (waxy tissue).

All vertebrates are *bilaterally symmetrical*—that is, the left and right sides of the body are alike. The body is usually divided into a head and a trunk. The more advanced land vertebrates have a neck. In *mammals* (animals with milk glands for feeding their young), the trunk is divided into a *thorax* (chest) and abdomen. Vertebrates never have more than two pairs of limbs.

Scientific classification. Vertebrates are classified in the phylum Chordata and make up the subphylum Vertebrata.

Related articles in ***World Book*** include:

Amphibian
Amphioxus
Bird
Chordate
Fish
Invertebrate
Lamprey
Mammal
Nervous system (In vertebrates)
Prehistoric animal (Animals with backbones)
Reptile
Shark
Skate
Tail

Vertical take-off aircraft. See **V/STOL; Helicopter.**

Vertigo. See **Dizziness.**

Vervain. See **Verbena.**

Verwoerd, Hendrik (1901-1966), was prime minister of South Africa from 1958 to 1966. He was the main architect of the policy of racial separation known as *apartheid.* See **Apartheid.**

Hendrik Frensch Verwoerd was born in Amsterdam in the Netherlands. He migrated with his family to South Africa when he was three months old. He was educated at Stellenbosch University and overseas. In 1927, Verwoerd became professor of psychology at his old university.

In 1937, Verwoerd moved from academic work to politics. He became the editor of the new Nationalist daily newspaper, *Die Transvaler,* in Johannesburg. He was appointed to the Senate (upper house of parliament) after the National Party's electoral victory in 1948. In 1950, he became minister of native affairs and began energetically developing the apartheid policy. After becoming prime minister in 1958, he developed *the homelands policy* (see **South African homelands**). He also steered the country to republican independence and its break with the Commonwealth of Nations in 1961. He was stabbed to death in parliament by a temporary parliamentary messenger in September 1966.

Very high frequency waves, also called *VHF waves,* are electromagnetic waves in the frequency band from 30 megahertz (30 million cycles per second) to 300 megahertz (300 million cycles per second). VHF wavelengths range from 1 to 10 metres. Portions of the VHF band are assigned to television and frequency modulation (FM) radio stations and to amateur radio operators. Mobile radios, aeroplane communication systems, and electronic navigation systems also operate in the VHF band. VHF waves travel in straight lines, like light waves. Their transmission is ordinarily limited to line-of-sight paths. Obstructions, such as buildings, reflect or absorb them.

See also **Frequency modulation; Short waves; Television** (Broadcasting).

Vesalius, Andreas (1514-1564), a Flemish anatomist and doctor, made important contributions to the study of human anatomy. His book *On the Structure of the Human Body,* or *Fabrica* (1543), was the first manual of human anatomy with clear and detailed illustrations. Vesalius is often called the founder of human anatomy.

Vesalius was born in Brussels, in what is now Belgium. At the age of 23, he became a professor of anatomy and surgery at the University of Padua in Padua, Italy. An innovative teacher, Vesalius performed dissections on human corpses as he taught. The traditional method of instruction had been for the teacher to read from a prepared text while an assistant did the dissection. Vesalius also popularized the use of drawings to help make anatomy lectures more easily understood.

Vesalius had been trained in anatomy from the widely accepted writings of Galen, a doctor who practised medicine in the A.D. 100's. However, through his many dissections, Vesalius found errors in Galen's theories. In *Fabrica,* Vesalius corrected many of these theories, including Galen's description of the *sternum* (breastbone). The book also contains the first accurate descriptions of the small bones of the head and ear, and excellent illustrations of the muscles and skeleton. Many of the illustrations were drawn by skilled artists. Modern anatomy textbooks are modelled on *Fabrica.* Later in his career, Vesalius served as doctor to Holy Roman Emperor Charles V and to Philip II of Spain.

See also **Medicine** (The Renaissance; picture: The scientific study of anatomy); **Biology** (picture: The human muscular system).

Vespasian (A.D. 9-79) was a Roman emperor. Rome prospered under his rule. He set up new taxes and supervised their collection, thereby restoring the empire's financial condition. He built a forum and the Temple of Peace, the Colosseum, and other buildings (see **Forum, Roman; Colosseum**). He also founded professorships to encourage education.

Vespasian was born near Reate, a city northeast of Rome. His full name was Titus Flavius Vespasianus. He became a senator and, during A.D. 43 and 44, commanded troops in the conquest of Britain. In A.D. 67, Emperor Nero sent Vespasian to put down a Jewish rebellion in Judea. During the year after Nero's death (A.D. 68), Galba, Otho, and Vitellius followed one another as emperor. Finally, in A.D. 69, Vespasian's troops occupied Rome and proclaimed him emperor. In Rome, the Senate enacted the *Lex de imperio Vespasiani,* the first known written statement of the powers of a Roman emperor. Vespasian was succeeded by his son, Titus.

Vesper. See **Evening star.**

Vespucci, Amerigo (1454-1512), was an Italian-born explorer after whom America was named. He claimed to have explored what is now the American mainland in 1497 and believed he had reached a "New World." Christopher Columbus had sailed to this area in 1492. But Columbus thought he had arrived at islands off the coast of Asia. He did not realize that he had reached a New World until his voyage to the mainland in 1498.

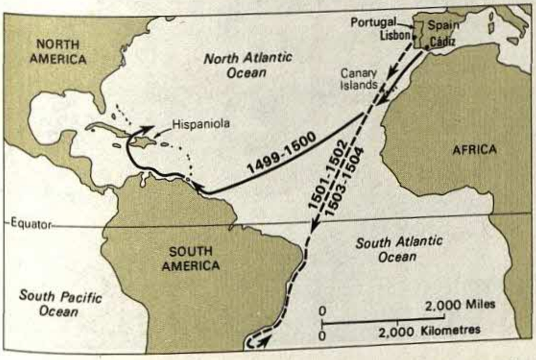
Martin Waldseemüller, a German mapmaker, believed that Vespucci was the first European to reach the New World. In 1507, he suggested that the land be named *America.* Soon, this name was used throughout Europe. Today, however, many scholars doubt Vespucci's role in the exploration of America.

Life and expeditions. Vespucci was born in Florence and studied navigation as a youth. He spent his early career in the banking firm of Lorenzo di Pier Francesco de' Medici of Florence. In 1491, he moved to Seville, Spain, and became connected with a company that equipped ships for long voyages.

Istituto e Museo di Storia della Scienza, Florence, Italy

Amerigo Vespucci

Vespucci later claimed that he made four voyages to the New World. After what he called his first voyage, in 1497, he said he had sighted a vast continent (South America). In 1499 and 1500, Vespucci took part in an expedition led by the Spanish explorer Alonso de Ojeda. During this voyage, Vespucci's ship travelled along the coast of Venezuela. In 1501 and 1502, and again in 1503 and 1504, Vespucci sailed with the fleet of Gonçalo Coelho, a Portuguese captain. Both of these expeditions explored the southern coast of Brazil.



Amerigo Vespucci made three known voyages to America, the first one in 1499. He reported that he also reached America in 1497, but most historians now question this claim.

Vespucci's reputation came largely from a letter he wrote to Lorenzo di Pier Francesco de' Medici in 1502 or 1503. In it, Vespucci told of his discovery of a new continent and vividly described the land and its people. The letter was published in 1503 or 1504 under the title of *Mundus Novus* (*New World*). It became extremely popular and later was published in several editions and translations. The letter established Vespucci as a famous explorer.

Vespucci became a Spanish citizen in 1505 and went to work for a government agency that regulated commerce with the New World. He served as chief navigator for the agency from 1508 until his death.

The controversy. Soon after Vespucci died, scholars began to question his claims of discovery. They found little evidence to support his own reports of making a voyage in 1497. Vespucci also claimed to have led all the expeditions, but he actually had been only a navigator or commander of a single ship. In time, Christopher Columbus became known as the European discoverer of the New World.

Vessel, Blood. See **Blood; Artery; Vein.**

Vesta was the goddess of the home and family in Roman mythology. The hearth was the centre of family life in ancient Rome, and Vesta's symbol was the fire in the hearth. Every Roman home had a shrine that honoured Vesta and the household gods called the *lares* and the *penates.*

Vesta was the daughter of Saturn, the god of fertility and planting, and Ops, the goddess of fertility and the harvest. Vesta was also the sister of Jupiter, the king of the gods. In myths, she was portrayed as young and unmarried. Vesta resembled the Greek goddess Hestia.

In addition to being worshipped by individual families, Vesta had an important public role as a protector of the city of Rome. This role may have originated during the early days of Rome, when a king ruled the city. Vesta safeguarded the welfare of the king's household, a matter of concern to the entire community.

A temple honouring Vesta stood in the Forum in Rome. In the temple burned a permanent sacred flame that symbolized the Roman belief in the eternity of the city. The flame was tended by six priestesses known as *Vestal Virgins.* The Romans considered it a great honour to be chosen to serve as a Vestal Virgin. The priestesses often had considerable power and influence in Roman political life.

See also **Hestia; Lares and penates.**

Vesuvius is the only active volcano on the mainland of Europe. It is probably the most famous volcano in the world. It rises on the Bay of Naples in southern Italy, about 11 kilometres southeast of the city of Naples. Vesuvius has been studied by scientists more than any other volcano because it erupts frequently and is easy to reach.

Vesuvius is a cone within the rim of Mount Somma, a big crater formed when the top of the mountain collapsed in the eruption of A.D. 79. The height of Vesuvius changes with each eruption. In 1900, the cone was 1,303 metres high. But after several eruptions since then, its height has dropped to 1,277 metres. The top of the active cone is a cup-shaped crater, ranging from 15 to 120 metres across. Vesuvius spouts columns of steam, cinders, and sometimes small amounts of lava into the air.

Mount Vesuvius towers over the city of Naples, Italy. Despite the volcano's frequent eruptions, many people farm the nearby land. The ash from Vesuvius has made the soil extremely fertile.

Many people live on the lower slopes of the mountain and on the plains at its foot, in spite of Vesuvius' history of disastrous eruptions. The volcanic soil is extremely fertile and the area is famous for its vineyards of wine grapes.

Early eruptions. Prehistoric people probably saw Vesuvius in eruption. Roman legends say that the gods had once used the mountain as a battleground, but at the time of Christ it had been dormant for hundreds of years. A series of earthquakes alarmed the people that lived in the neighbourhood of Vesuvius for 16 years following A.D. 63. The first recorded eruption occurred on Aug. 24, A.D. 79, when the cities of Herculaneum, Pompeii, and Stabiae were covered by ashes and lava. An eyewitness account of the disaster was written by a Roman author, Pliny the Younger. His uncle, Pliny the Elder, was killed during the eruption.

In 472, ashes poured from the crater in such great amounts that they were carried by the wind as far as Constantinople (now Istanbul). Streams of lava and boiling water fell on the villages at the foot of the mountain in 1631. About 18,000 people were said to have died. There were other destructive eruptions in 1794, 1822, 1855, 1872, 1880, 1895, 1906, 1929, and 1944.

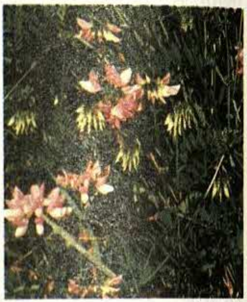
Recent eruptions. The greatest destruction in recent years occurred in April 1906, when several towns were destroyed. In the eruption of March 1944, which destroyed the village of San Sebastiano, soldiers of the Allied armies helped the people of nearby towns escape the lava and volcanic dust.

Before the eruption of 1944, thousands of visitors came to Vesuvius every year. They could go down into the crater for some distance and see a crimson stream of lava flow from the cone and turn into a bed of cold stone. A cable railway which took visitors to within 137 metres of the edge of the crater was destroyed in this eruption. Many people still visit the area.

A Royal Observatory was established on the slopes of the mountain in 1844. Since that time scientists have kept a constant watch over the volcano during and between eruptions. One observer lost his life standing by his post.

See also **Herculaneum; Mountain** (table; picture chart); **Naples; Pompeii; Volcano** (Composite volcanoes; table).

Vetch is the name of about 140 species of plants of the pea family. Many vetches climb over other plants, or scramble over the ground. Some have a bushy, free-standing *habit* (type of growth).



Vetch

The leaves are made of many leaflets. Vetches climb by means of a single or branched tendril that grows out from the end of the leaf. The flowers resemble miniature sweet peas. They grow either singly or in elongated flower heads. The flowers may be blue, blue-purple, pink, white, or yellow.

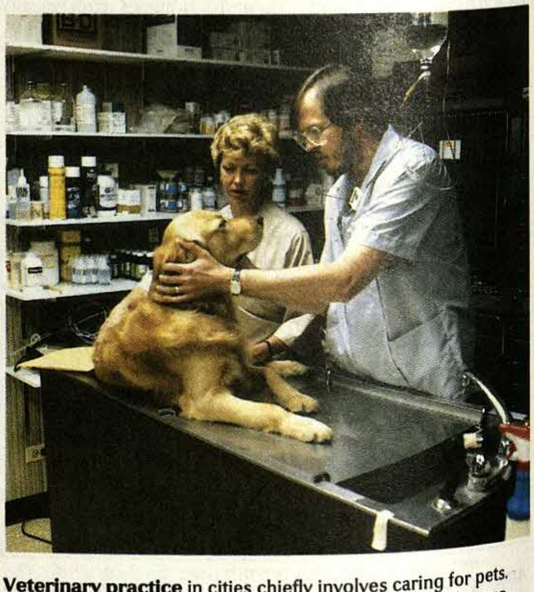
Vetches grow mainly in open country with scrub, or along hedgerows. They are native to the Northern Hemisphere but have been introduced to other regions. Common vetch is grown as a *fodder plant* (food for livestock), and as a green manure. Like other members of the pea family, vetches have roots with nodules that contain nitrifying bacteria that help enrich the soil.

See also **Nitrogen Cycle.**

Scientific classification. Vetches belong to the pea family, Leguminosae (Fabaceae). Common vetch is *Vicia sativa.*

Veterinarian. See **Veterinary medicine.**

Veterinary medicine is the branch of medicine that deals with the diseases of animals. Animal doctors are called *veterinary surgeons,* or *vets.* Their work is especially valuable because many animal diseases can be transmitted to human beings. Such diseases are called *zoonoses.* They include rabies, brucellosis, tuberculosis, *psittacosis* (parrot fever), and *tularaemia* (rabbit fever).



Veterinary practice in cities chiefly involves caring for pets. Vets examine and treat sick and injured animals, and also provide vaccinations and other preventive care.

Rural veterinary surgeons help keep livestock and other farm animals in good health. The vet shown above is putting a powdered antibiotic into the throat of a cow.

Zoo vets specialize in the treatment of wild animals. The vet on the left is taking a blood sample from a lion in Africa while preparing the animal for shipment to a zoo.

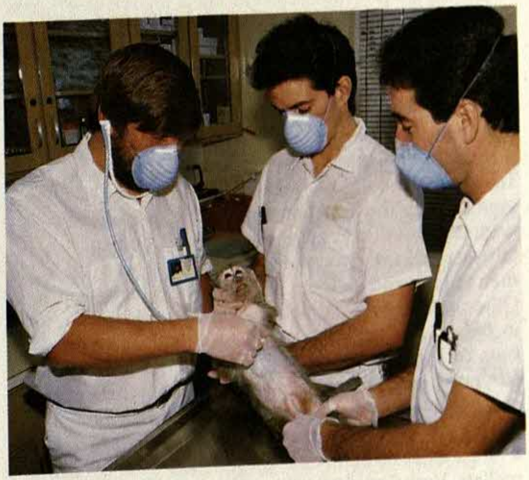
In cities, many veterinary surgeons are associated with small-animal clinics, which contain equipment much like that used in hospitals for human beings. There, animals may be cared for during illnesses, and surgery may be performed if necessary. Veterinary surgeons play an important role in the control of rabies. Vaccination of cats and dogs against rabies and the diagnosis of the disease are part of the vet's duties.

Many veterinary surgeons also are associated with the public health services of cities, states, or national governments. Their special skills and knowledge are helpful in controlling diseases carried by animals. Vets may inspect meat and meat products, or direct some of the operations in slaughter-houses and meat processing plants. They may work in laboratories testing milk or other dairy products, or preparing serums and vaccines.

On farms. Perhaps the most important activity of the veterinary surgeon is the care and treatment of livestock. Vets help keep farm animals in good health to prevent outbreaks of animal diseases. Epidemics of animal diseases, called *epizootics,* may be extremely dangerous, not only to the animals but to human beings as well.

Veterinary surgeons have played an important part in controlling bovine tuberculosis, a form of tuberculosis that can be passed from cows to human beings. In the early 1900's, the governments of several countries set up programmes to wipe out this disease. In many countries, vets test dairy cattle for tuberculosis. Other projects work to control and eradicate bovine brucellosis. This disease also can be transferred from cattle to human beings (see **Brucellosis**).

A college of veterinary medicine has modern operating rooms and equipment. This photograph shows veterinary surgeons teaching students how to fit a cast on a horse's rear leg.



Veterinary research has increased the knowledge of many human diseases. These vets are studying a macaque to learn about contagious diseases that infect both monkeys and people.

Veterinary surgeons give many kinds of inoculations to protect farm animals against disease. For example, they inoculate young pigs against swine fever, an infectious disease caused by a virus. At one time, this dread disease often swept from farm to farm, killing all the pigs in an entire farming community.

Veto is the right of one person to prevent other people from making a decision or taking an action. The word *veto* is Latin for *I forbid.* If a body has the power to make decisions or take actions only if it is unanimous, then any one member can veto the decision if he does not agree with it. A member of a body that can reach a decision by majority vote has no power of veto.

In *common law* countries, juries in law cases have to be unanimous. For this reason, each member of the jury has a power of veto. In Scotland, a *civil law* country, juries can make majority decisions.

According to Article 27 of the Charter of the United Nations, all decisions of the Security Council, except procedural ones, require the concurring votes of the five permanent members of the Council. This rule means that each of the permanent members has the right to veto the decisions of the council.

In the United States, and other countries that have a congressional system of government, the president has a right to veto bills passed by the Congress (see **Congress of the United States**).

Vexillology. See **Flag** (introduction; table: Flag terms).

VHF waves. See **Very high frequency waves.**

Via Appia, also called Appian Way. See **Appian Way.**

Viaduct is like a bridge, except that it crosses over dry land instead of water. Some viaducts do cross water, but they also cross dry land instead of merely extending from one bank to the other as a bridge does.

Most viaducts consist of a series of supports under beam-and-slab or arch construction. Viaducts carry railway tracks over valleys and gorges. Some viaducts are built higher than the general level of the land to carry railways over roads or to make a safe crossing for roads over railways. The ancient Romans built the first viaducts. The aqueducts they built to carry water to cities often also served as roadways.

One of the longest viaducts ever built was a portion of the 177-kilometre Key West extension of the Florida East Coast Railway, in the United States. Viaducts that extended over the open sea formed 48 kilometres of this extension. Parts were destroyed by a hurricane in 1935, but these were rebuilt as a road a few years later. The main part of the pier viaduct over the mouth of the River Tay in Scotland has 84 steel spans and is over 3.2 kilometres long. The Tunkhannock viaduct on the Lackawanna Railway, in Pennsylvania, U.S.A., is one of the largest steel and concrete viaducts in the world. It is 724 metres long and includes 10 spans of 55 metres each. Other well-known viaducts are the Pecos River viaduct in Texas, U.S.A., and the Landwasser viaduct across Albula Pass, in the canton of Graubünden, Switzerland.

Vibraphone is a percussion instrument that consists of a number of aluminium bars arranged on a frame like the keys of a piano. Most vibraphones have 37 bars with a range of three octaves. A player strikes the bars with mallets. Variations in tone quality can be produced by using mallets that have heads of soft or hard yarn. A hollow metal tube called a *resonator* lies beneath each bar of a vibraphone. An electric motor operates a revolving valve inside each resonator. The valve creates a vibrating sound called a *vibrato.* The vibraphone also has a *sustaining pedal* that can lengthen or muffle each note. The vibraphone has a harplike sound.

The vibraphone was invented in 1921 by Hermann Winterhoff, an American executive, and engineers of a U.S. instrument manufacturer. It has become an especially popular instrument in jazz.

See also **Music** (picture: Percussion instruments).

Vibration, in mechanics, is the rapid back-and-forth motion of an object. Almost everything vibrates, though the vibrations may be too weak, too fast, or too slow for us to detect. Vibration occurs during earthquakes and when the oceans move up and down causing the tides. A car vibrates as a result of repeated explosions in the cylinders of its engine. Many sounds are produced by vibrating objects.

Vibrations can be used to perform many useful tasks. When we tap a salt cellar, for example, we use vibrations to make the salt flow. Workers use devices that produce vibrations to pack down soil under roadways. In medicine, vibrators are used to treat sore muscles.

Vibrations can also cause problems for people and machines. Vibrations at certain rates and intensities cause discomfort. Too much vibration can cause people to lose their ability to concentrate or even make them violently ill. In machines, vibrations can cause noise, wear, and breakage.

Engineers have developed ways of correcting vibration problems. They may use elastic materials or springs to reduce the effects of vibration. For example, cars are equipped with pneumatic tyres to absorb the vibrations caused by travelling over rough roads. Ventilating fans in buildings are often mounted on soft steel springs. Engineers generally try to eliminate vibration problems when they design a machine.

Vibrations can be described by their *amplitude* and their *frequency.* Amplitude is usually the distance the vibrating object travels from a position of rest. Frequency is the number of complete vibrations during a certain period, usually one second. Frequency is measured in a unit called the *hertz.* Most people can hear vibrations with frequencies from 20 to 20,000 hertz.

Vibrations can be classified as *free* or *forced,* depending on whether an outside force keeps the vibration going. A guitar string, for example, vibrates freely after it is plucked. On the other hand, the vibration of a violin string is forced while the bow is drawn over it. Most musical instruments rely on a phenomenon called *resonance* to increase their sound. Resonance occurs when the frequency of the force driving the vibration is in step with the frequency of the object's free vibration.

See also **Sound; Wave.**

Viburnum is the name of some 150 species of small trees and shrubs of the Northern Hemisphere. Most species are natives of warm parts of Asia and North America. Viburnums usually have white or pinkish flowers, often arranged in dense, round heads.

Viburnums are grown for their showy, scented flowers, which often appear before the foliage, and also for their berries, which may be yellow, red, or black. *Guelder-rose* is a European species cultivated for its large flowers like snowballs. See **Guelder-rose.**

Viburnums are shrubs or small trees that are often grown in parks and gardens. Their attractive, sweet-smelling flowers are generally white or pink.

Several North American species, such as arrowwood, were used by American Indians for their medicinal properties.

Viburnums grow best in fertile, moist soil in a sheltered, sunny position.

Scientific classification. Viburnums belong to the honeysuckle family, Caprifoliaceae. Guelder-rose is *Viburnum opulus,* and arrowwood is *V. acerifolium.*

Vicar of Wakefield. See **Goldsmith, Oliver.**

Vice president is the second highest executive officer in the government of some nations. In many countries, the vice president assumes the presidency if the president dies, resigns, is removed from office, or becomes disabled. In some nations, including Argentina and the United States, the vice president also serves as the presiding officer of the national senate.

Viceroy is an official who rules a province or colony in the name of a king. The term *viceroy* means *in place of the king.* The British governor general of India was a viceroy. After World War II ended in 1945, opposition to colonialism grew worldwide. As a result, the term *viceroy* fell into general disfavour and is seldom used today.

Vichy (pop. 30,527) is a resort town on the Allier River in central France (see **France** [political map]). During World War II, Vichy was the capital of unoccupied France from July 1940, until November 1942. Marshal Henri Philippe Pétain headed the Vichy government. In November 1942, German troops occupied all France. Vichy was the seat of the German-controlled French government until 1944, when Allied troops freed the city.

During the months that France was under German occupation, the name *Vichy* came to stand for *collaboration* with the Germans. The name took on this meaning because French government officials in Vichy made compromises and concessions to meet German demands. Before World War II, Vichy was a famous health resort.

Victor Emmanuel was the name of a king of the Kingdom of Sardinia and of two kings of Italy.

Victor Emmanuel I (1759-1824) ruled as king of the Kingdom of Sardinia from 1814 to 1821. The kingdom included the region of Piedmont in Italy and the island of Sardinia. Faced with a revolution in 1821, he abdicated his throne in favour of his brother, Charles Felix, rather than grant a constitution and declare war on Austria.

Victor Emmanuel II (1820-1878) was king of the Kingdom of Sardinia from 1849 to 1861 and the first king of Italy from 1861 to 1878. Drawing his main support from the Piedmont, a region at the base of the Alps that was under his rule, he took the leadership of uniting Italy. His first step was to get the Austrians out of Italy. He made an alliance with France, and in 1859 the two countries defeated Austria. Victor Emmanuel gained Lombardy. Revolutions began in central Italy shortly after. In 1860, Giuseppe Garibaldi conquered the Kingdom of the Two Sicilies. As a result, central Italy (except for Rome) and the Kingdom of the Two Sicilies joined the Kingdom of Sardinia in 1861 to form a united kingdom of Italy. Victor Emmanuel became king. Venetia joined the kingdom in 1866, and Rome joined in 1870. Victor Emmanuel II was born in Turin, Italy.

Victor Emmanuel III (1869-1947) became king of Italy after the assassination of his father, Humbert I, in 1900. The people honoured and respected him during the early years of his reign, but later they came to despise him. Victor Emmanuel refused to proclaim martial law to stop Benito Mussolini's march on Rome in 1922. The king made no protest when Italy became a fascist dictatorship. Victor Emmanuel tried to save the monarchy in 1946 by abdicating in favour of his son, Crown Prince Humbert. But the Italian people voted to abolish the monarchy in a 1946 election. Victor Emmanuel III was born in Naples.

Related articles in ***World Book*** include:

Cavour, Count di
Fascism
Garibaldi, Giuseppe
Italy (History)
Mussolini, Benito
Papal States
Sardinia, Kingdom of
Savoy
Sicilies, Kingdom of the Two

Victor Harbor (pop. 7,228) is one of South Australia's most popular tourist towns. It is situated on Encounter Bay, 83 kilometres south of Adelaide. Its Mediterranean climate, rugged coastline, and excellent swimming, surfing, and sailing attract more than 1,500,000 visitors each year. Many people cross the causeway from the mainland to visit Granite Island and see the fairy penguins there. The Bluff was the site of early whaling. Inman Valley is a fine example of a glacial valley.

The bay was discovered and named by the explorer Matthew Flinders in 1802. During the early 1800's, whaling stations were established near the site of the present town and on Granite Island, which protects the entrance to the harbour.

Victoria (1819-1901) was queen of the United Kingdom of Great Britain and Ireland from 1837 to 1901 and became one of the most famous rulers in English history. Her 63-year reign was the longest in British history. Great Britain reached the height of its power during this period. It built a great colonial empire and enjoyed tremendous industrial expansion at home. As a result, the time of Victoria's reign is often called the Victorian Age.

Early years. Victoria was born at Kensington Palace in London on May 24, 1819. She was the only child of Edward, Duke of Kent, fourth son of George III, and of Victoria Maria Louisa, daughter of Francis, Duke of Saxe-Coburg-Saalfeld. Victoria's father died before she was a year old, and she was reared by her mother.

Victoria's uncle, King William IV, died on June 20, 1837. He had no heirs, and so she immediately succeeded to the throne. Victoria was crowned queen at Westminster Abbey on June 28, 1838. Lord Melbourne, her first prime minister, educated her in politics and government.

Events of her reign. Many important events took place during Victoria's reign. Britain fought in the Opium War (1839-1842) in China and acquired the island of Hong Kong. Britain also fought in the Crimean War (1853-1856) against Russia, and in the Anglo-Boer War (1899-1902) in order to protect its interests in southern Africa.

In 1858, control of India was transferred from the East India Company, a trading firm, to the British government. Victoria was proclaimed empress of India in 1876. Britain seized control of Egypt and many other areas. British colonies united in Australia and Canada, and these countries became important members of the growing British Empire.

The development of a worldwide colonial empire made Britain the richest country in the world. Britain ended restrictions on foreign trade, and its colonies became both sources of raw materials and markets for its manufactured goods. Britain was called the *workshop of the world.* The British Empire included a quarter of the world's land and a quarter of its people.

The population of Britain itself increased 50 per cent during Victoria's reign, and Britain changed from mainly an agricultural to mainly an industrial nation. More people won the right to vote, and local government became increasingly democratic. The British Parliament passed acts that improved labour conditions, required all children to attend school, and reformed the civil service. In Ireland, the Church of Ireland was separated from the government, and the land system was reformed.

Achievements. The British people had little respect for the throne when Victoria became queen. This situation had developed because of irresponsible conduct by the two kings before her, George IV and William IV. But Victoria showed herself to be a hard-working monarch concerned with the welfare of her people, and she gained their affection and admiration.

Victoria was a wise and capable monarch. But Britain's greatness was due chiefly to her able prime ministers, including Lord Melbourne, Sir Robert Peel, Viscount Palmerston, Benjamin Disraeli, William Gladstone, and the Marquess of Salisbury. Gradually the queen had to accept that the British monarchy would not survive unless its powers were reduced and her ministers in Parliament were allowed to rule the nation. Victoria accepted the switch from political ruler to symbolic ruler. For this reason, Britain's monarchy has survived, while the monarchies of most other countries have not.

Personal life. In February 1840, Queen Victoria married a cousin, Prince Albert of Saxe-Coburg-Gotha. They had four sons and five daughters. The prince was a scholar, philanthropist, and businessman, and the people came to respect him. He actively assisted his wife in her royal duties. Albert died in 1861, and Victoria never recovered from her grief at his loss. She withdrew from social activities and dressed in black for many years. Victoria died in 1901, and her eldest son became King Edward VII.

Related articles in ***World Book*** include:

Albert, Prince
Edward VII
English literature (Victorian literature)
United Kingdom (History)
Windsor

Queen Victoria of the United Kingdom reigned for 63 years, longer than any other British monarch. The photograph above shows her, *seated centre,* with members of the royal family in 1881. The queen's oldest son, *seated right with cane,* was crowned King Edward VII in 1901.

The Twelve Apostles, an unusual series of rock formations near Port Campbell on the southern coast of Victoria, are well-known landmarks and tourist attractions.

Victoria *The Garden State*

Victoria lies in the southeastern corner of the Australian continent. It is the smallest of the mainland states in area, but it is the most densely populated and the most highly urbanized. In population, it is second only to New South Wales.

Victoria began as a community of sheep farmers. Other kinds of farming followed. Victoria's development was accelerated by the discovery of gold. It also has resources of brown coal and offshore oil. Today, Victoria is a highly industrialized state, and most of its people work in manufacturing and commerce. Industry and population are concentrated in Melbourne, its capital city. Melbourne is one of the 50 largest cities in the world. About 70 per cent of all Victorians live there.

Much of Victoria's land is well-suited to farming, and Victoria is sometimes called *the garden state.* There is rich dairy-farming and market-gardening country in the southeast. The southwest consists of extensive grazing lands. In the north, these two areas merge into wheat-farming plains. The far northwest is semidesert, with rich, irrigated vineyards along the Murray River. There are mountainous areas in the northeast.

Victoria's climate is generally temperate, but it is subject to wide variations. Victoria experiences extremes of summer heat and irregular drought and flood.

Victoria's population is mostly of English, Scottish, and Irish origin. But the large number of immigrants from other parts of Europe who have settled in Victoria since World War II (1939-1945) have modified this pattern. More recently, Victoria has received refugees from Vietnam.

Victoria's parliamentary government and its system of local government are both modelled on those of Britain. Its educational system, social services, public utilities, cultural institutions, and communications media are all well advanced.

Facts in brief about Victoria

State capital: Melbourne.
Chief cities: Melbourne, Geelong, Berwick, Ballarat.
Area: 227,600 square kilometres. Fifth largest state.
Population: *1991 census*—4,243,719. Second largest state.
Animal emblem: Leadbeater's possum.
Bird emblem: Helmeted honeyeater.
Floral emblem: Pink heath.
Chief products: *Agriculture* —cattle, forest products, fruit, hay and straw, milk and dairy products, poultry and eggs, sheep, vegetables, wheat, wool. *Manufacturing* —building materials, chemical products, clothing, farm machinery, food and beverages, footwear and textiles, light engineering products. *Mining* —brown coal, natural gas, oil.

Government

Victoria has two houses of parliament. The upper house is called the Legislative Council. The lower house is called the Legislative Assembly.

For Legislative Council elections, Victoria is divided into 22 electoral provinces. Each province is represented by two members who are elected for two terms of the Legislative Assembly. One member in each province takes it in turn to retire at each general election of the Legislative Assembly. For Legislative Assembly elections, the state is divided into 88 electoral districts. Each district returns one member who is elected for a four-year term, unless parliament is dissolved before this period, which can occur in certain circumstances.

Any person who is 18 years or older can stand for parliament, and voting is compulsory for all Victorians over the age of 18. Members of parliament are elected by preferential voting. See **Preferential voting.**

Victoria modelled its system of government on that of the United Kingdom. The responsibility for introducing new legislation, for planning and accounting for government finances, and for administering the affairs of government rests with a ministry that must enjoy the support of a majority of members of the Legislative Assembly. The governor of Victoria acts as the queen's representative. The governor chooses as the first minister, or *premier,* the leader of the majority of the Legislative Assembly. The premier, who sometimes also acts as treasurer, either chooses fellow ministers to form the government, or allots portfolios among ministers who are elected by the members of the majority party. Each minister is responsible to parliament for the administration of one or more government departments.

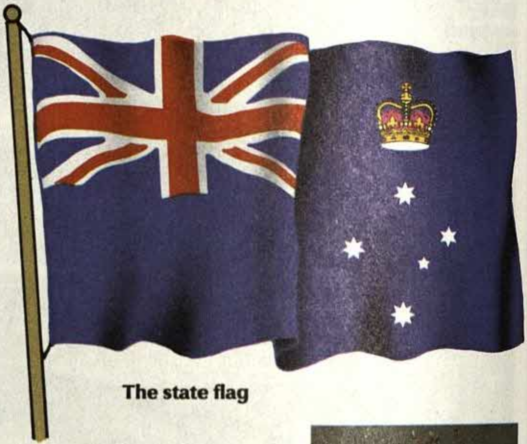
The Victorian parliament has power over all matters except those allotted to the Australian federal Parliament by the Constitution. But much of the revenue of the Victorian government is granted to it by the federal government, which can effectively limit the state's powers. The Victorian parliament is responsible for education, health, housing, law enforcement, power supply, public works, roads and transport, and water supply.

The ministry, or *cabinet,* normally decides on new legislation, which is introduced into parliament by the responsible minister. Most ministers are members of the Legislative Assembly, but some belong to the Legislative Council. Money bills are always introduced in the assembly. The council can reject them, but it may not amend them. Bills must pass both houses of parliament in order to become law.

Once a bill becomes law, it is administered either by one of the government departments or by a statutory body, such as the electricity commission or the gas and fuel corporation. These statutory bodies are established by acts of parliament.

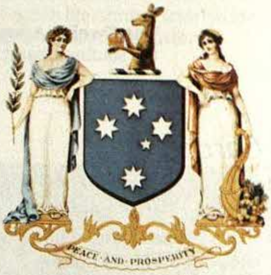
Local government is the responsibility of Victoria's 210 municipal districts, which consist of 69 cities, 5 towns, 6 boroughs, and 130 shires. The constitution and powers of municipal councils are set by act of parliament. Councillors are elected for three years by the ratepayers and residents of each municipality. They serve without pay. Each council elects its own chairman, who is called the *mayor* in cities, boroughs, and towns and the *president* in shires.

Symbols of Victoria include the state flag, which dates from 1877, and the state coat of arms, which dates from 1910. Both the flag and the shield of the coat of arms show the Southern Cross. On the coat of arms, the two female figures beside the shield represent the state motto: *peace and prosperity.* Above the shield, a kangaroo holds the British crown. The pink heath has been the state floral emblem since 1958. The state's faunal emblems—Leadbeater's possum and the helmeted honeyeater—were proclaimed in 1971.



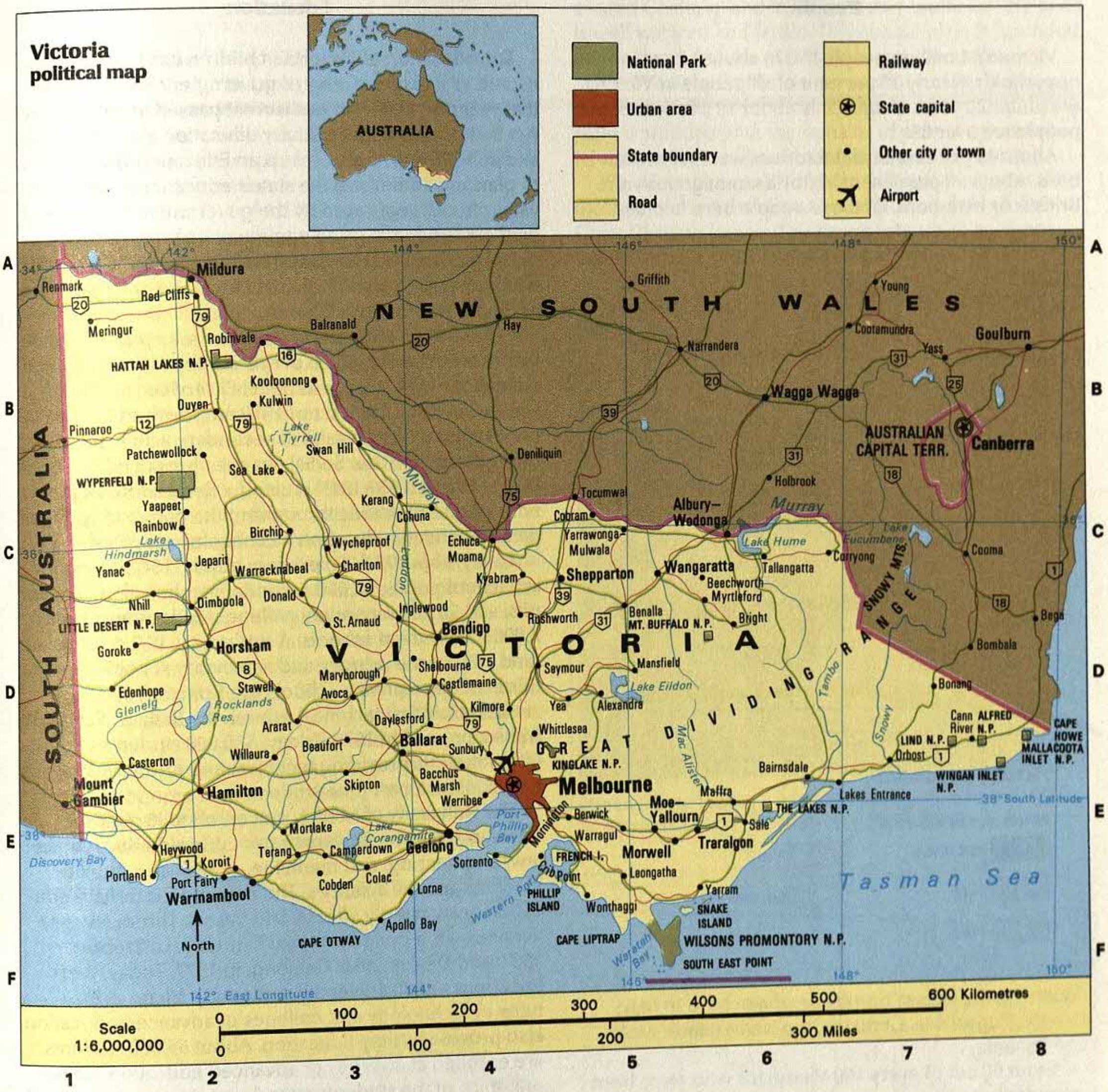
The state flag

State coat of arms



Floral emblem
(Pink heath)

The Victorian Parliament House stands in Spring Street in Melbourne. Building work began in 1856.



Victoria map index

Cities and towns

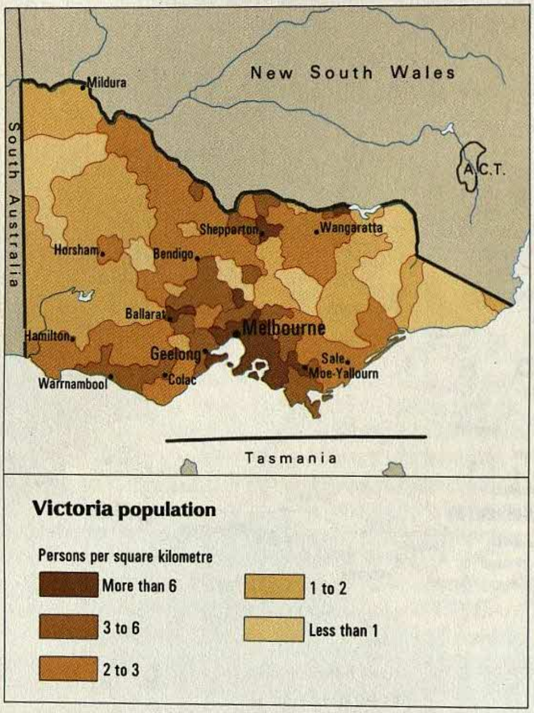
Albury-Wodonga*	41,046	C	6
Alexandra	5,999	D	5
Apollo Bay	888	F	3
Ararat	7,622	D	3
Avoca	2,190	D	3
Bacchus Marsh	11,853	E	4
Bairnsdale	10,772	E	6
Ballarat	78,347	D	3
Beaufort	1,199	D	3
Beechworth	4,966	C	6
Benalla	8,334	C	5
Bendigo	67,310	D	4
Berwick	66,140	E	5
Birchip	1,249	C	2
Bonang		D	7
Bright	11,834	D	6
Camperdown	3,315	E	3
Cann River	318	D	7
Casterton	1,842	D	1
Castlemaine	6,812	D	4
Charlton	1,749	C	3
Churchill	5,526	E	5
Cobden	1,421	E	3
Cobram	6,378	C	5
Cohuna	4,317	C	4
Colac	9,170	E	3
Corryong	1,274	C	6
Craigieburn	6,584	D	4
Cranbourne†	70,835	E	4
Creswick	4,836	D	3
Crib Point	4,180	E	4
Daylesford	3,111	D	4
Dimboola	4,058	C	2
Donald	1,465	C	3
Drouin†	3,974	E	5
Echuca-Moama*	9,437	C	4
Emerald†	3,608	E	5
Euroa†	4,323	D	5
Geelong	145,323	E	4
Goroke	314	D	1
Hamilton	9,756	E	2
Hampton Park†		E	4
Hastings†	28,746	E	4
Healesville†	11,755	E	5
Heywood	7,124	E	2
Horsham	12,553	D	2
Inglewood	712	C	3
Jeparit	479	C	2
Kerang	4,024	C	3
Kilmore	8,826	D	4
Kooloonong		B	3
Koroit	1,459	E	2
Korumburra		E	5
Kulwin		B	2
Kyabram	5,534	C	4
Kyneton	8,296	D	4
Lakes Entrance	4,104	E	7
Lara†	5,186	E	3
Leongatha	3,957	E	5
Leopold†	3,452	E	4
Lorne	935	E	3
Maffra	10,117	E	6
Mansfield	8,475	D	5
Maryborough	7,705	D	3
Melbourne	3,022,157	E	4
Melton†	34,737	E	4
Meringur		A	1
Mildura	39,058	A	2
Moe-Yallourn	18,367	E	5
Mornington	29,960	E	4
Mortlake	3,004	E	2
Morwell	17,763	E	5
Myrtleford	4,315	C	6
Nhill	2,028	C	2
Numurkah†	6,815	C	4
Ocean Grove-Barwon Heads†	8,680	E	4
Orbost	6,562	E	7
Ouyen	1,503	B	2
Pakenham†	30,595	E	4
Port Campbell†		F	3
Port Fairy	2,465	E	2
Portland	10,136	E	2
Queenscliff†	3,121	E	3
Rainbow	655	C	2
Red Cliffs	2,450	A	2
Robinvale	1,770	B	2
Rochester†	7,423	C	4
Saint Arnaud	2,741	D	3
Sale	13,853	E	6
Sea Lake	847	B	2
Seymour	11,689	D	4
Shelbourne		D	3
Shepparton-Mooroopna	30,238	C	4
Skipton	508	E	3
Sorrento		E	4
Stawell	6,340	D	2
Sunbury	15,297	D	4
Swan Hill	9,358	B	3
Tatura†	2,702	C	4
Terang	2,040	E	3
Torquay†	3,522	E	4
Traralgon	19,702	E	5
Wangaratta	16,598	C	5
Warracknabeal	3,659	C	2
Warragul	12,924	E	5
Warrandyte†		E	4
Warrnambool	23,950	E	2
Werribee	72,189	E	4
Whittlesea	95,525	D	4
Willaura	350	D	2
Wonthaggi	6,446	E	5
Wycheproof	3,008	C	3
Yaapeet		C	2
Yanac		C	1
Yarram	2,004	E	6
Yarrawonga-Mulwala*	5,522	C	5
Yea	4,737	D	5

*Cities on Victoria-New South Wales border; population in Victoria only.
†Does not appear on map; key shows general location.
Source: 1991 census preliminary figures; 1986 census for smaller places.

People

Victoria's 4 million people live in about 1.2 million households. Nearly 30 per cent of all people in Victoria are under 20 years of age. Only about 10 per cent of the people are over 65.

About 80 per cent of all Victorians were Australian-born. About 30 per cent of Victoria's immigrants were British- or Irish-born. Of those people born in other countries, the largest groups are those born in Italy, Greece, Yugoslavia, Germany, the Netherlands, Malta, and Poland.



About 60 out of every 100 Victorians who were born overseas have become naturalized Australian citizens. About 10,740 people of Aboriginal descent live in Victoria. The population of Victoria continues to increase, but the rate of increase is slowing.

About 75 per cent of all Victorians describe themselves as Christians. There are 30,000 people of the Jewish faith, and 44,000 Muslims, Hindus, and people of other non-Christian faiths.

About 70 per cent of all Victorians live in greater Melbourne. Nearly 90 per cent of all Victorians live in urban centres or rural settlements with a population of 1,000 or more. Women slightly outnumber men in the towns and cities. Men considerably outnumber women in country areas. Since 1871, more than half of all Victorians have lived in cities and towns. The steady drift of people into the major cities, especially greater Melbourne, still continues.

Sports and recreation are important pastimes in Melbourne. Horse racing, cricket, fishing, and Australian Rules football are favourite activities.

Education

The education of Victoria's children has been accepted as a responsibility of government since 1872. In that year, the Victorian parliament passed an Education Act that provided that primary education should be free and compulsory. It also set up an Education Department to plan and administer the state's education system. Private schools, registered by the government, continue to exist alongside the growing network of state schools. These are largely church-sponsored schools. Some are elite, fee-paying institutions. But most are parish schools of the Roman Catholic Church.

In the 1800's, secondary education was provided only by private schools, which prepared pupils for public examinations for entrance to the civil service and to university. An Education Act of 1910 empowered the Education Department to establish secondary schools throughout the state. Social changes produced by World War II (1939-1945) created a demand for higher educational standards throughout the community. Since then, secondary education has become universal.

Today, about 294,000 primary pupils, 154,000 secondary school pupils, 47,000 secondary technical school pupils, and 26,000 secondary college pupils attend about 2,000 government schools. A further 256,000 students attend 729 private primary and secondary schools. Two-thirds of these private schools are Roman Catholic.

Australia's first technical school, the Ballarat School of Mines, opened in 1870. Today, 380,000 students attend 60 institutions providing technical and further education. Most are part-time students.

The University of Melbourne enrolled its first students in 1855. The university soon offered education in law, engineering, and medicine, as well as in the humanities and the sciences. The demand for tertiary education grew rapidly after World War II. Three new universities were opened: Monash in 1961; La Trobe in 1967; and Deakin, near Geelong, in 1977. Today, there are about 47,000 university students in Victoria. Institutes of technology and colleges of advanced education also provide tertiary education. About 65,000 students are enrolled at colleges of advanced education. Nearly one-third of the students attend part-time.

Monash University is located in Melbourne. The biological sciences are a featured area of study at the university.

Land

Victoria is shaped roughly like an irregular triangle. The state is located in the southeastern corner of the Australian continent. With an area of 227,600 square kilometres, it is the smallest of the mainland states.

The state's greatest length from east to west is 789 kilometres, and its greatest breadth is 467 kilometres. Victoria has a coastline of 1,677 kilometres. Its shores face the Great Australian Bight; Bass Strait, across which lies the island state of Tasmania; and the Tasman Sea.

The south bank of the Murray River, which meanders 1,930 kilometres from the Australian Alps to its mouth in South Australia, forms most of Victoria's northern boundary with New South Wales. The rest of this boundary extends 177 kilometres to Cape Howe, on the eastern coast. Victoria's western boundary, with South Australia, is a straight line 450 kilometres long. It extends south from the Murray River to Discovery Bay.

Land regions. Victoria is divided into four basic land regions, two of them further subdivided. The Coastal Belt includes Gippsland, the Melbourne district, and the Western District. The Mountains and Tablelands Region includes the Australian Alps and central Victorian hills. The Murray Basin Slopes Region, which lies mainly in New South Wales, extends into Victoria. The Lower Murray Basin Region extends into South Australia.

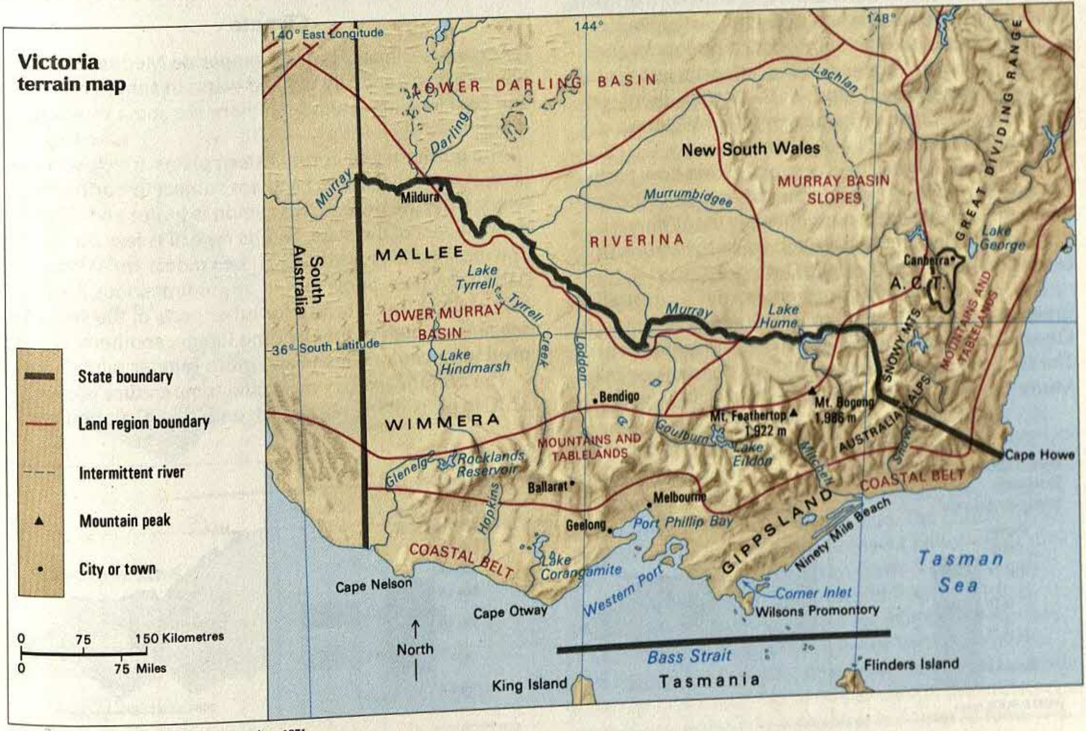
The Coastal Belt includes Gippsland, a long coastal plain of rich pastoral country. Gippsland is bordered on the south by a series of large lakes and swamps and by the Ninety Mile Beach, which is a long sand bar.

The Melbourne district consists of the coastal plains surrounding Port Phillip Bay. To the north and west is a relatively infertile volcanic plain. To the southwest, around Geelong, and to the east and southeast, the plain is well watered and fertile. This coastal plain is bounded on the north and the east by hills and mountains.

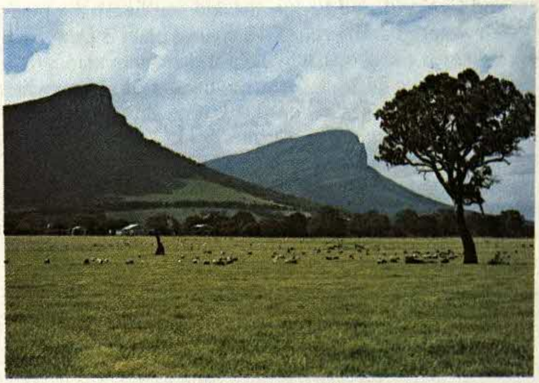
The Western District, in the southwest, lies between the central hills and the coast. This low-lying, undulating plain is studded with the remains of extinct volcanoes. Its rich volcanic soil makes it good pastoral country.

The Mountains and Tablelands Region includes the foothills of the Australian Alps, which are part of the Great Dividing Range. This range extends to northern Queensland. It separates the inland plains from the coastal plains of Victoria and New South Wales. The region is heavily timbered, and rises above the snow line to high upland plains and rocky peaks.

Murray River follows a winding course and forms most of Victoria's northern boundary with New South Wales.



Adopted from *Regional Landscapes of Australia* © 1971 Nancy and Andrew Learmonth.



The Grampians, a rugged range of mountains, rise abruptly from the Western District, a major wool-producing area.

Northwestern Victoria produces most of the state's wheat. Large silos store the grain, which is then transported by train.

The district is scored by deep valleys and gorges through which rivers flow. Mount Bogong (1,986 metres) and Mount Feathertop (1,922 metres) are the highest points of the Australian Alps in Victoria.

North and west of Melbourne, from the high peaks of the northeast to the South Australian border, the Alps trail away into the central Victorian hills. This heavily timbered country is studded with low peaks.

The Lower Murray Basin Region includes the area between these hills and the Murray River, in north-central Victoria. In this area lie the Murray Plains, the comparatively flat flood plains of the rivers that flow northward into the Murray. This region of open, lightly timbered pastoral land is still subject to flooding.

To the west of the Murray Plains, the Lower Murray Basin region takes in the Mallee and Wimmera districts of northwestern Victoria and the southeast of South Australia. This is drier country, made up of rocks and sand left behind by the sea. In the far northwest are the semiarid, uneven sand ridges of the Mallee, lightly covered with a low scrub. The brown soil of Victoria's wheatlands lies southeast of these areas.

Rivers and lakes. The rivers of Victoria flow north from the Dividing Range into the Murray, or south from the range into the sea. An exception is the Wimmera River, which flows north through western Victoria to Lake Hindmarsh and the Little Desert.

The Murray, Victoria's northern border, is Australia's greatest river. Its Victorian tributaries are the Mitta, Kiewa, Ovens, Goulburn, Campaspe, and Loddon rivers. The Hume Reservoir, east of Albury-Wodonga on the Murray, is one of Australia's largest artificially made lakes. It has a surface area of about 225 square kilometres, and controls flooding lower down the river.

The Gippsland Lakes, an extensive group of interconnected saltwater lagoons in eastern Victoria, cover 350 square kilometres. They are open to the sea across a shallow sand bar at Lakes Entrance.

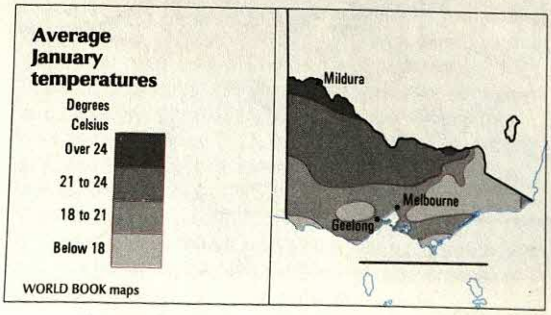
Victoria's largest lakes are in the western part of the state. Their water is *brackish* (salty). The lakes in the northwest are fed by rivers, and sometimes dry up in the summer. Lake Tyrell is usually dry. A factory extracts salt from the lake bed. The lakes in the southwest accumulate water in craters formed by volcanoes. Victoria's largest lake, Lake Corangamite (290 square kilometres) is a lake of this type. The lake is saltier than the sea. No rivers flow from it.

Climate

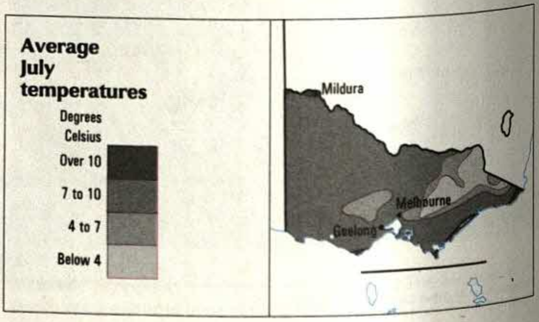
Victoria's climate is of the temperate Mediterranean type—that is, generally dry and warm in summer, wet and cool in winter—although there are some regional differences.

The northern and northwestern plains are close to the central Australian desert and are subject to northerly winds from the desert. This region is hotter and drier than the rest of the state, and its rainfall is less reliable. The mountainous northeast is the coldest and wettest part of the state. Snow falls in this mountainous area every winter, but it is rare for other parts of the state to see snow. South of the Dividing Range, southerly winds produce a cooler climate and more regular rainfall.

The average January maximum temperature is over 32 °C in parts of the northwest, under 24 °C along the



WORLD BOOK maps



coast, and under 20 °C on the higher mountains. Average July maximums across the lower country range between 10 and 16 °C. Temperatures frequently fall below freezing point in the mountains. Rainfall ranges from an annual average of 310 millimetres in the northwest to 890 millimetres in the southeast. Annual rainfalls of 1,300 millimetres have been recorded in the northeast.

Economy

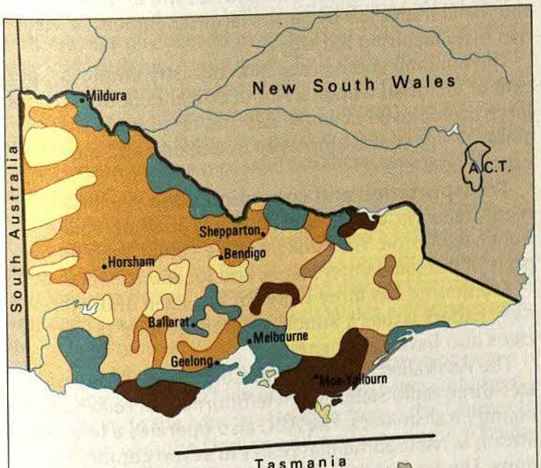
The annual value of agricultural production in Victoria, including crops, livestock, wool, and dairy products, is more than 4,000 million Australian dollars. The value of all mining and quarrying is about 2,500 million dollars.

Manufacturing industries form Victoria's main economic base. They employ nearly a quarter of the state's workers. The total value of Victoria's manufacturing industry represents about a third of Australia's total manufacturing production.

Farming. Twelve per cent of all Victorians live in the countryside. Six per cent of the state's adult workers earn a living on the land. They occupy more than 34,000 farms and 13 million hectares of land. This comprises 60 per cent of Victoria's total land surface.

There are 9,700 farms of less than 100 hectares, mainly vineyards, orchards, and vegetable, dairy, and poultry farms. About 500 farms of 2,000 hectares or more take up one-fifth of all Victorian farmlands. These are sheep *stations* (large farms) and mixed wheat and sheep farms.

About 2.4 million hectares are sown for crops of grain and hay each year, mostly in northwestern and western Victoria. The main cereals are wheat, barley, and oats. Victoria grows a third of Australia's tobacco.



Victoria land use

Tobacco is grown at Myrtleford in Victoria. The state produces a third of Australia's tobacco crop.

More than 27 million sheep, about 40 per cent of them pure Merino, and 9 million lambs graze over 6.5 million hectares, or about 44 per cent of Victoria's farmlands. These farms are in the north and west of the state. Many farmers in the northwestern district combine wheat-growing with grazing. About 10 million sheep and lambs are slaughtered each year for export and local consumption. Live sheep are exported to the Middle East for meat. Live sheep are also exported for breeding.

Beef cattle number about 2 million. There are about 1.6 million dairy cattle. More than 2 million cattle and calves of all types are slaughtered each year.

Victoria has about 11,500 dairy farmers. The state's dairy industry produces 3,700 million litres of milk each year. Most of the milk is used for butter, cheese, and processed milk products. Most dairy products are exported. The local market absorbs the rest.

Apples, cherries, berries, and other fruit are grown in the hills east of Melbourne. Pears and stone fruit grow in the Goulburn River valley. Citrus fruit and grapes grow around Mildura. Most fruit are tinned. Some grapes are dried into raisins, currants, and sultanas for export and some are used to make wine.

Fishing crews produce almost 18,000 metric tons of seafood annually. Some lobsters and abalone are exported, but most fish are sold locally.

Water, irrigation, mining, and power. Victoria's total irrigation capacity, excluding municipal reservoirs, is 13.3 billion cubic metres. Irrigation systems provide water for 600,000 hectares, mainly through the Murray and Goulburn-Loddon systems. Almost 90 per cent of this land is under pasture. Australia's highest dam, the 180-metre Dartmouth Dam, was completed in 1977. It impounds Victoria's largest reservoir. This reservoir, located on the Mitta Mitta River, has a capacity of 4 billion cubic metres. A 150-megawatt generating station has been installed at the foot of the dam. The Eildon Reservoir, on the Goulburn River, holds 3.4 billion cubic metres. The Hume, on the Murray, holds 3.1 billion cubic metres. Both provide irrigation and hydroelectricity. There are many other storages for irrigation purposes.

The main supply of electricity for Victoria is generated from the vast brown coal resources in the La Trobe Valley, in Gippsland. Up to 10 per cent of the brown coal used is converted into *briquettes* (a domestic fuel). The

Power production is centred on Yallourn in the La Trobe Valley. The area has huge deposits of brown coal.

Oil rigs in Bass Strait have tapped huge reserves of oil and natural gas off the coast of Victoria.

rest, 30 million metric tons a year, is used to fuel thermal stations run by the State Electricity Commission (SEC) of Victoria. The largest of these stations are at Hazelwood, Yallourn, Newport, and Morwell. There is also a huge 2,000-megawatt station at Loy Yang. Electricity generated by hydrostations at Eildon and Kiewa is less than 3 per cent of the total production of 29,000 million kilowatt hours produced by the SEC. Power is also purchased from the Snowy Mountains Hydro-Electric Authority.

Natural gas was discovered off the Gippsland coast in 1965. The Gas and Fuel Corporation of Victoria began converting consumers' appliances to natural gas in 1969. Pipelines convey the gas from Bass Strait wells to a treatment plant at Longford, in Gippsland, and on to Dandenong for distribution. Annual production exceeds 200 million gigajoules, and proven reserves will meet Victoria's needs until at least 2010. Annual gas sales increased twelve-fold between 1970 and 1990. The corporation supplies over 1.2 million consumers through a 23,000 kilometre system of pipelines. The western Victorian cities of Warrnambool and Portland are supplied with natural gas from onshore gas fields near Port Campbell.

Oil was discovered in commercial quantities off the Gippsland coast in 1967. Known reserves are estimated at 245 million cubic metres. Production has reached 66,000 cubic metres a day, providing 60 per cent of Australia's total refinery requirements. After treatment at Longford, the oil is conveyed by a 187-kilometre pipeline to a storage terminal on Western Port. It is then piped to refineries at Crib Point, Corio, and Altona, and shipped to refineries in Sydney and Brisbane.

Deposits of copper, silver, lead, and zinc were discovered near Benambra, in northeastern Victoria, in 1978.

Manufacturing and construction. More than 22 out of every 100 Victorian workers are employed in manufacturing industries. Men outnumber women by more than 2 to 1, except in clothing and footwear, where 75 per cent of the workers are female. Victoria has 350,000 manufacturing workers. It runs close behind New South Wales in the value of manufacturing output.

More than 80 per cent of all Victorian manufacturing is centred on Melbourne. Geelong is the second manufacturing centre. Power production has assisted industrial growth in the La Trobe Valley. Ballarat, Bendigo, Wangaratta, Shepparton, Warrnambool, Portland, and Wodonga have developed some industries. Portland also has an aluminium smelter.

Heavy and light engineering and the construction and maintenance of motorcars, farm machinery, aircraft, and ships are well-established industries. The engineering and metal trades are by far the largest segment of Victorian manufacturing industry.

The building and construction industry employs 6 per cent of Victorian workers. About 20 per cent of the work force is employed in wholesale and retail trade, and about 11 per cent is employed in banking and other financial operations.

Transportation and communication. Victoria's roads, railways, and air and shipping lines all radiate from Melbourne. They link the state capital with other parts of the state, other states, and locations overseas.

Melbourne has three daily papers. Each of the three daily papers issues a Sunday edition. Several provincial cities also have daily papers.

The Australian Broadcasting Corporation (ABC) operates three radio stations in Melbourne that relay to five country transmitters. The ABC also operates a television station in Melbourne that relays to seven country stations. The Special Broadcasting Service operates a radio station and a television station in Melbourne for ethnic communities. The station broadcasts programmes in a number of languages. Melbourne also has nine commercial radio stations.

History

Australian Aborigines occupied the land now called Victoria for at least 35,000 years before Europeans first sighted it. The Aborigines' ancestors migrated across the sea from Asia to the north coast of Australia. Within a few centuries, they spread south across the continent. The Aborigines lived in tribal groups, each with its own territory and language. When the first Europeans reached the Port Phillip district of New South Wales, later to become Victoria, there were perhaps 7,000 Aborigines inhabiting the land. There had been more, but the tribes had been ravaged by smallpox before the Europeans arrived.

The first European to see Victorian soil was a man named Hicks, a lieutenant aboard James Cook's *Endeavour*. Cook had sailed from New Zealand to explore the coast of New Holland. On April 19, 1770, his lieutenant sighted land, which Cook named *Point Hicks*. In 1797, George Bass sailed a whaleboat along the southeastern coast around Wilsons Promontory to Western Port. The next year, Bass and Matthew Flinders circumnavigated Van Diemen's Land (now Tasmania). Governor John Hunter named the strait they had discovered after Bass.

In 1800, James Grant sailed along the coast from west to east but did not enter Port Phillip Bay. Lieutenant John Murray's official exploration party made the first entry in February 1802. On May 8, 1802, Matthew Flinders, sailing the *Investigator* from England to New South Wales, also explored the bay. The Yarra River was discovered by Charles Grimes, acting surveyor general of New South Wales, in 1803.

Worried by the French interest in Australia, the British authorities sent Lieutenant Colonel David Collins, along with a party of soldiers and convicts, to establish a settlement on Port Phillip Bay. Collins' party landed near the present site of Sorrento in October 1803. Water supplies were inadequate, and the Aborigines seemed hostile. Collins moved his party to Hobart in February 1804. Meanwhile, one of the convicts, William Buckley, had escaped. Buckley lived with the Aborigines for 32 years, until he was discovered by settlers in 1835. A second attempt at settlement was made by a party under Captain Wright. This party landed at Western Port in 1826. This settlement was abandoned after 15 months. Sealers and whalers, many of them escaped convicts with Aboriginal wives, made more successful unofficial settlements along the coast.

Explorers began to probe Victoria from the north. Governor Thomas Brisbane persuaded a skilled bushman, Hamilton Hume, to lead a party organized by Captain William Hovell. They explored the land between the southern limits of the New South Wales settlement and the southern coast.

In 1836, Major Thomas Mitchell, the surveyor general, followed the Lachlan and then the Murrumbidgee rivers down to the Murray. He then traced the Murray to its junction with the Darling and explored some 200 kilometres of the Darling.

In 1835, John Batman landed near the mouth of the Yarra. He signed a treaty with men of the Dutigalla tribe under which he laid claim to 242,000 hectares of land in return for an annual tribute of 400 Australian dollars worth of blankets, tomahawks, and flour. Batman was followed closely by John Pascoe Fawkner. Fawkner ignored Batman's claim and also settled by the Yarra.

In 1836, the New South Wales government permitted occupation of pastoral land on payment of an annual licence fee of 20 dollars. A stream of land-seekers crossed the Murray. Many settlers who arrived from overseas also took up land south of the Murray.

By 1850, all the Port Phillip district, apart from the Mallee desert and the mountains, had been occupied by squatters and their 6 million sheep.

The spread of pastoral settlement brought conflict with the Aborigines. Some settlers were killed by Aborigines. The most notorious incident was the Faithfull Party Massacre of 1838. In this incident, 18 men, led by George Faithfull, were taking sheep to Victoria. The party was attacked by Aborigines at the site of present-day Benalla. Most of the Faithfull party were killed. A rescue party later took revenge on the Aborigines.

Many other Aborigines were killed by whites. Attempts were made to establish a protectorate to "Christianize and civilize" the Aborigines and convert them to a settled agricultural life. These attempts failed, and were abandoned in 1849. The establishment of Aboriginal reserves and mission stations after 1860 did little to arrest the continued decline of the Aborigines.

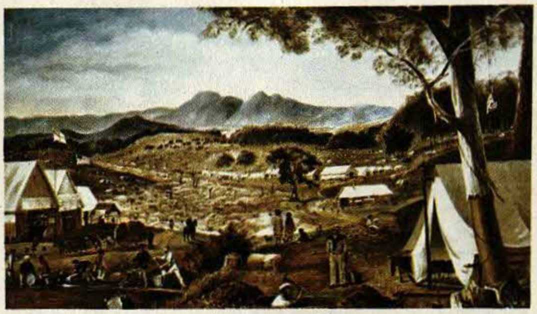
In 1839, Charles Joseph La Trobe was appointed superintendent of the Port Phillip District. By 1850, Melbourne had been established as the administrative and commercial centre of the district and was a busy town of 23,000 people. Geelong and Portland were also well established as ports and trading centres.

The Port Phillip district was granted representation in the New South Wales Legislative Council in 1843, but the people of the district were not satisfied. They wanted to separate from New South Wales. The British Parliament granted their wish in the Australian Colonies Government Act of 1850, and the colony of Victoria was proclaimed on July 1, 1851. The new colony was to have its own Legislative Council. La Trobe became the first governor of the newly proclaimed colony.

Four days after the proclamation of the colony, Louis Michel announced that he had found gold at Anderson Creek, in the hills east of Melbourne, and James Esmond exhibited gold that he had found at Clunes. Other discoveries followed at Castlemaine, Ballarat, Buninyong, and Bendigo. Gold fever gripped the local population, and the infection spread throughout the world. In five years, more than 250,000 people poured through Melbourne on their way to the diggings. In ten years, gold worth 200 million dollars was dug out of Victorian soil, a third of the world's output in that time. Most came from shallow alluvial diggings. When these diggings petered out, companies were formed to promote deep-shaft mining, but the output of gold steadily declined.

The goldfields administration established a special force of police, which carried out frequent licence inspections. These became known as *digger hunts*. The diggers bitterly resented this tax on their labour, particularly because it took no account of success or failure. They expressed their grievances at mass meetings and demonstrations. These came to a head in 1854 at Ballarat. There, the diggers hoisted their own flag, burned their licences, and, led by Peter Lalor, massed under arms in the Eureka Stockade. Government troops stormed the stockade on Dec. 3, 1854. About 30 miners and five soldiers were killed.

The diggers lost the fight, but popular sympathy was on their side, and they won their point. The government



Diggings at Ararat were painted by E. Roper about 1855. Thousands of people came to the colony in search of gold.

Droving cattle was depicted by S. T. Gill in 1870. Unlike the overlanders, drovers worked in already developed areas.

brought 13 of the leaders to trial, but a jury acquitted all except one of them. The Legislative Council had already decided on a new constitution, granting representative government. It now declared in favour of *universal male franchise*—that is, that all adult men would be given a vote. The miner's licence was replaced by a miner's right, which also gave its holder the right to vote.

Gold made Victoria the most wealthy of the Australian colonies, and also the one with the largest population. But the decline of mining created a need for new avenues of profitable employment. Legislation in the 1860's aimed at *unlocking the land*—that is, making available to individuals land that was held in large pastoral runs. These workers would then farm the land. Many of the early allocations of land were too small to be economic, and were later consolidated into larger farms. Victoria became a major producer of wheat.

By 1892, Melbourne had grown to a city of nearly 483,000 people. The city grew wealthy. The Victorian bubble burst in the 1890's. A strike of maritime workers spread from Victoria across the continent. The land boom collapsed, and speculators went bankrupt. Banks closed their doors. There was widespread unemployment. In the years between 1892 and 1907, 185,000 more people left the state than entered it. Melbourne and Victoria lost their preeminence to Sydney and New South Wales.

Victorians strongly supported the federation of the Australian colonies in the public campaigns and referenda that led to the formation of the Commonwealth of Australia. Part of the federal agreement was that Melbourne should be the federal capital until a site was selected in New South Wales. The Commonwealth Parliament was opened in the Exhibition Building on May 9, 1901. Parliament met in Melbourne until it moved to Canberra in 1927.

World War I (1914-1918) stimulated industrial development in Victoria, largely in the area of light industry, but the car industry began operations in 1925 and 1926 in both Melbourne and Geelong. The growth of industry was supported by the new power supply that was generated from brown coal that had been mined in the La Trobe Valley beginning in 1924.

Economic development was severely checked by the depression of 1929 to 1933, at the height of which more than a third of all Victorian workers were out of work. Recovery was not complete until World War II, which further stimulated the growth of Victorian industry. Since World War II ended in 1945, the population of Victoria has increased from 2 million to over 4 million. In that time, Victoria has absorbed more than 700,000 immigrants.

Important developments since World War II include the growth of the motor industry and the discovery of offshore natural gas and oil.

Related articles in *World Book* include:

Biographies

Bass, George
Batman, John
Collins, David
Fawkner, John Pascoe
Flinders, Matthew
Henty (family)
Hovell, William
Hume, Hamilton
Lalor, Peter
La Trobe, Charles Joseph
Menzies, Sir Robert Gordon
Mitchell, Sir Thomas L.

Cities, towns, and districts

Ballarat
Bendigo
Geelong
Gippsland
Mallee
Melbourne
Shepparton
Wangaratta
Warrnambool
Wimmera

Physical features

Australian Alps
Goulburn (river)
Grampians
La Trobe Valley
Murray River
Port Phillip Bay
Snowy
Yarra

Outline

I. Government
II. People
III. Education
IV. Land
  A. Land regions
  B. Rivers and lakes
V. Climate
VI. Economy
  A. Farming
  B. Water, irrigation, mining, and power
  C. Manufacturing and construction
  D. Transportation and communication
VII. History

Questions

On what date was the colony of Victoria proclaimed?
Which universities were opened in Victoria after World War II?
During which years did the Australian Parliament meet in Melbourne?
What is the name of Victoria's largest lake?
What were *digger hunts?*
What is the main source of Victoria's electricity supply?
What was the main provision of the Education Act of 1872?
What two natural resources were discovered off the Gippsland coast in the 1960's?

Victoria is the capital of British Columbia. The city lies along a picturesque harbour at the southeastern tip of Vancouver Island. Victoria's scenic beauty attracts large numbers of tourists each year.

Victoria (pop. 66,303; met. area pop. 255,547) is the capital of British Columbia, Canada. Victoria lies along a picturesque harbour at the southeastern tip of Vancouver Island. See **Canada** (political map).

Victoria covers about 18 square kilometres. The Victoria metropolitan area occupies about 400 square kilometres.

About 2 million tourists visit Victoria annually, and many retired people move to the area. Victoria's attractions include its scenic surroundings and its narrow streets and neat gardens. Victoria has a milder climate than any other Canadian city. Boatbuilding, fishing, forestry, research and technology, and tourism are important industries in the Victoria area.

Victoria is the capital of Hong Kong. It is part of the bustling urban area of northern Hong Kong that is sometimes called Hong Kong City. The area has about 1 million people. Victoria is sometimes called Central District. Modern office and government buildings stand along Victoria's waterfront. See **Hong Kong.**

Victoria, Lake. See **Lake Victoria.**

Victoria Cross is the highest military decoration awarded in the United Kingdom and the Commonwealth of Nations. The sovereign awards it for exceptional bravery in the face of the enemy. Queen Victoria established the award in 1856. Fewer than 1,500 people have won it.

Victoria Desert. See **Great Victoria Desert.**

Victoria Falls is a waterfall that the British explorer David Livingstone sighted in southern Africa in 1855. The explorer named it in honour of Queen Victoria. Victoria Falls lies between Zambia and Zimbabwe, about halfway between the mouth and source of the Zambezi River. The Zambezi is about 1.5 kilometres wide at this point and drops suddenly into a deep, narrow chasm. A canyon about 65 kilometres long permits the water to flow out. The height of the falls varies from 78 metres on the right bank to 108 metres in the centre.

The mist and spray created by Victoria Falls can be seen for a great distance. This cloud and the constant roar caused the people of the area to name the falls *Mosi oa Tunya* (smoke that thunders). A hydroelectric plant produces a small amount of power at the falls. A railway bridge crosses the river just below the point where the waters rush out of the chasm.

See also **Waterfall** (picture; chart).

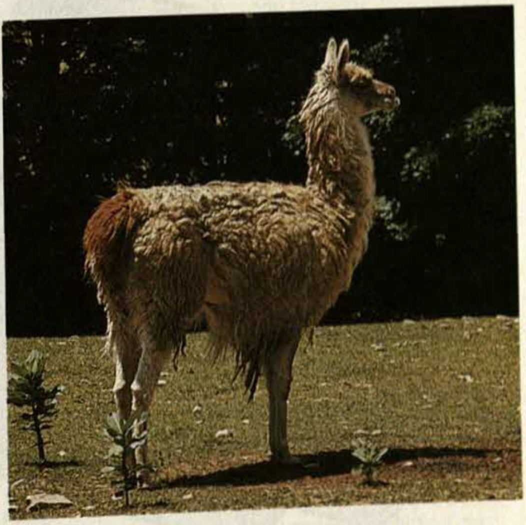
Victoria Land is part of the Antarctic subcontinent. It lies on the shore of the Ross Sea almost due south of New Zealand. It is divided into North Victoria Land and South Victoria Land. Sir James Ross, a British explorer and naval commander, claimed the region for the United Kingdom during his 1839-1843 expedition.

Victorian Age. See **English literature** (Victorian literature); **United Kingdom, History of the; Victoria** (queen).

Vicuña is the smallest member of the camel family. It lives in the Andes Mountains of Bolivia, Chile, and Peru, in areas from 3,500 to 5,500 metres above sea level. Its home is generally near the snow line. The vicuña and guanaco are the two wild members of the camel family in South America. The other two, the alpaca and llama, are domesticated. None of the four has a hump.

The vicuña is 70 to 90 centimetres high at the shoulder and weighs 35 to 65 kilograms. Vicuñas eat grass. They usually live in herds that have one male and several females. The male defends a specific *territory* (area of ground) from other males.

Vicuñas have finer fleece than any other wool-bearing animal. A vicuña produces about 115 grams of fleece a year. The colour of the upper body is reddish yellow to deep tan or reddish brown. The belly and lower legs are white. The fleece grows until it hangs below the flanks



The vicuña lives in the Andes Mountains of South America. The fleece of the vicuña is used in making fine woollen fabrics.

and knees. Only the inner fleece is used. It is especially good for making high-grade *worsted* (a fine-textured woollen fabric).

So many vicuñas were killed for their wool that the species had become rare by the 1960's. Peruvian law now protects the animals. The ancient Inca Indians protected vicuñas and hunted them only once in four years. Only royalty could use the fleece.

Scientific classification. The vicuña is in the camel family, Camelidae. It is *Vicugna vicugna.*

See also **Animal** (picture: Animals of the mountains); **Alpaca; Guanaco; Llama.**

Vidal, Gore (1925-   ), is an American author best known for his novels. Some have historical themes, and others satirize American society. Vidal has also written essays, short stories, and plays.

Vidal's early novels, *Williwaw* (1946) and *In a Yellow Wood* (1947), draw on his experiences of war. Many of Vidal's novels use historical people as characters. *Julian* (1964) portrays the Roman emperor of the A.D. 300's who fought against Christianity. *Creation* (1981) is set in the 400's B.C. with famous characters such as the Chinese philosopher Confucius and the Persian rulers Darius I and Xerxes I. Vidal wrote a series of novels dealing with American history. They are, in the order of the periods they describe, *Burr* (1973), *Lincoln* (1984), *1876* (1976), *Empire* (1987), *Hollywood* (1990), and *Washington, D.C.* (1967). He satirized modern life in *Myra Breckenridge* (1968) and its sequel, *Myron* (1974). He satirized feminism in *Kalki* (1978).

Vidal's short stories were collected in *A Thirsty Evil* (1956). His essays were published in *Reflections Upon a Sinking Ship* (1969), *Homage to Daniel Shays* (1973), *Matters of Fact and Fiction* (1977), *The Second American Revolution* (1982), and *At Home* (1988). During the 1950's, Vidal wrote three detective novels under the name Edgar Box. His best-known play, *The Best Man* (1960), deals with intrigue at a presidential convention. He was born in West Point, New York.

Video. See **Television; Video camera; Videodisc; Videotape recorder.**

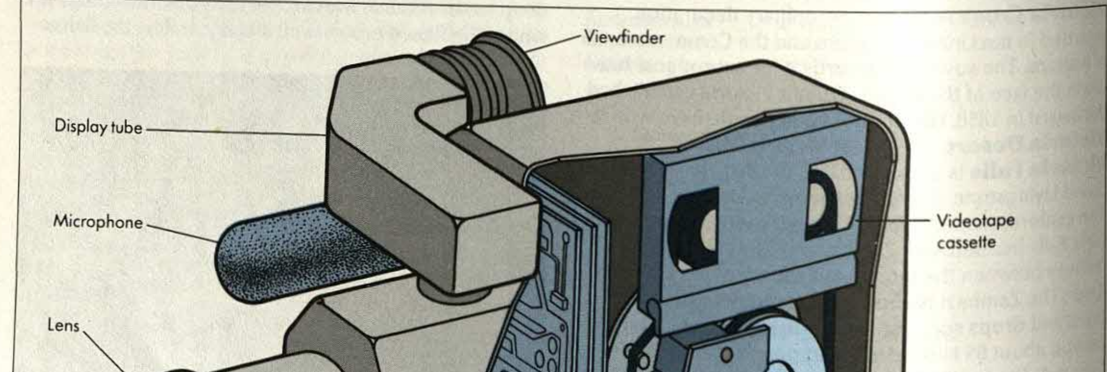
Video camera is a device that captures images and converts them into electronic signals for viewing on a television set. The images can be transmitted directly to the set or recorded on magnetic tape for later playback. Video cameras were first developed for TV broadcasts. Today, portable video cameras with built-in videotape recorders have gained popularity. These *camcorders* enable families to make their own home movies on videotape. Unlike film, videotape needs no developing and can be played back immediately after recording. See **Videotape recorder.**

How video cameras work. Video cameras pick up the light that is reflected from an object and convert it into electronic signals called *video signals.* This section describes the operation of a camcorder like the one illustrated. For information on how a television camera works, see **Television** (The television camera).

To create video signals, camcorders use a lens, an image-sensing device, and various electronic circuits. Light enters the camera through the lens. Nearly all camcorders have a *zoom lens* that allows the user to adjust the size of the image from a close-up to a long-range view. The lens focuses the light onto a light-sensitive

Parts of a camcorder

A camcorder uses a light-sensitive mechanism called a *charge-coupled device* to convert the colour images into electronic video signals. The signals then travel to the recording head for storage on videotape. In the display tube, a tiny TV screen shows the image that is recorded.



electronic sensing mechanism that is called the *charge-coupled device,* or CCD. Filters on top of the CCD separate the light into colours. The CCD produces electric signals that represent the image. Electronic circuits *amplify* (strengthen) these signals and change them into video signals. The video signals then travel to the recording head for storage on magnetic tape.

Most camcorders have a *viewfinder* that allows the camera operator to see the scene that the camera is shooting. Camcorders also have a microphone and so can capture sound along with images.

The development of video cameras began in the 1930's. Early video cameras were used only for live telecasts because devices for taping video signals did not become available until the 1950's. These cameras used vacuum tubes to turn light into electric signals and were too bulky for use outside the television studio. They produced images in black and white.

Colour video cameras were developed in the 1950's. Transistors gradually replaced many of the vacuum tubes that were used in the original cameras. As a result, video cameras weighed less and used less power. They could be moved outside television studios for televising news, sports events, and other programmes. Smaller video cameras were developed for closed-circuit television, the production of commercials, and other uses.

In the late 1970's, manufacturers developed portable video cameras for home use. Home video cameras could be held in one hand. But to record, they had to be connected to a videotape recorder. By the mid-1980's, the videotape recorder had become small enough to be combined with a video camera in a single compact unit—the camcorder. Camcorders became available in several tape systems, including Beta, VHS, and 8-millimetre. Most camcorders can play back a tape when they are connected to a television set by a video cable.

The *still video camera* also appeared in the 1980's. It captures and records images on a magnetic disc. Each disc can store up to 50 pictures. The pictures can be played back on a television by a machine that resembles a videotape recorder.

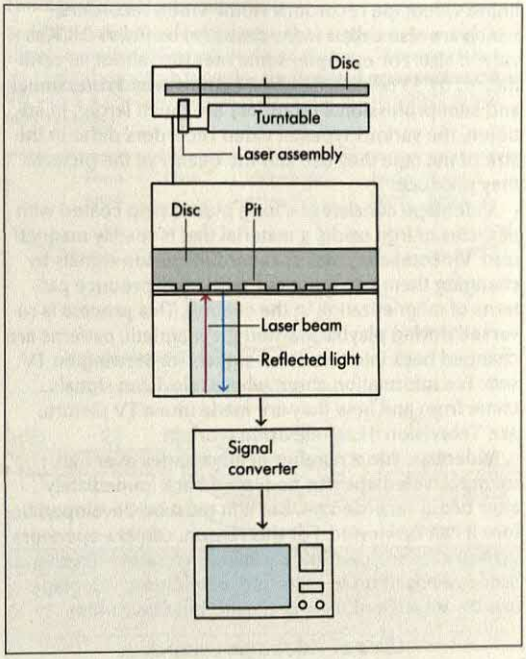
Video cassette recorder. See **Videotape recorder.**

Video game. See **Electronic game.**

Videodisc is a flat, round disc on which material has been recorded for reproduction on a television set. The word is also spelled *video disk* or *videodisk.* A videodisc is played on a special player that resembles a compact disc (CD) player and can be linked up to any TV set. Manufacturers prerecord programmes on the discs. Most videodisc players cannot record material but recorders are available for professional use.

Videodiscs are made of plastic with a reflective metal coating. During manufacture, the disc's surface is covered with billions of microscopic pits that wind in a spiral track. The pits form a code that represents the recorded pictures and sounds. As the disc spins on the turntable, the player reads the code and converts it into TV signals.

The information on videodiscs, as on compact discs and other *optical discs,* is played back by means of light. Inside the player, a *laser* aims a concentrated beam of light at the disc. The light reflects off the pits in a pattern that is read by a light-sensitive device in the player. The player converts the pattern, or code, into TV signals.



A videodisc player converts the pictures and sounds recorded on a disc into TV signals. A laser inside the player aims a beam of light at the rapidly spinning disc. Another device then reads the pattern of light reflected off the disc.

Manufacturers began developing videodisc systems in the early 1970's mainly for use as home entertainment. Most early videodisc players used a *stylus* (needle) instead of a laser to read the information recorded on the disc. The growing popularity of video cassette recorders (VCR's) in the early 1980's damaged sales of videodisc players, and production of stylus-model players was halted in the mid-1980's. Laser systems were purchased chiefly for use in education and industry.

By the late 1980's, interest in videodiscs had grown among people who wanted high-quality sound and images at home. Several manufacturers introduced combination players, which can play CD's and videodiscs. Many new videodiscs began to appear. They carried films, concerts of popular and classical music, and other entertainment.

See also **Compact disc; Optical disc; Television** (Video entertainment systems).

Videotape recorder is a device that records visual images and sound on magnetic tape. Videotape recorders, also known as *VTR*'s or simply *video recorders,* also play back the recorded *video* (picture) and *audio* (sound) information on television sets.

Videotape recorders were first used by the television broadcasting industry during the 1950's. Since then, several other types of VTR's have been developed in addition to the professional models used by TV broadcasters. For example, many schools and businesses use semiprofessional videotape recorders to record educational programmes and employee training films. Consumers record TV programmes and play back prerecorded cassettes of films, concerts, and other events on home videotape recorders. Home video recorders, which are also called *video cassette recorders* (VCR's), vary in size. For example, some measure about 46 centimetres by 33 centimetres by 8 centimetres. Professional and semiprofessional recorders are much larger. In addition, the various types of video recorders differ in the size of the tape they use and the quality of the pictures they produce.

Videotape consists of a long plastic strip coated with particles of iron oxide, a material that is readily magnetized. Videotape recorders record television signals by changing them into magnetic fields that produce patterns of magnetization in the coating. This process is reversed during playback, when the magnetic patterns are changed back into television signals for viewing on TV sets. For information about where television signals come from and how they are made into a TV picture, see **Television** (How television works).

Videotape has a number of advantages over film. For example, videotape can be played back immediately after being recorded on, but film must be developed before it can be viewed. For this reason, camera operators who use videotape can determine right away whether a scene needs to be re-recorded. In addition, videotape can be erased and recorded over, but film cannot.

Uses of videotape recorders

In the home, videotape recorders have become a popular part of home entertainment systems since they first appeared in the 1970's. VCR's are designed to enable consumers to tape television programmes while they are away from home and watch the programmes at their convenience. A timer on the recorder is set to turn the recorder on when the programme starts and off when it ends. Home recorders can record programmes on one channel while a person is watching a programme on another channel. People also use home recorders to play back prerecorded cassettes of films, sporting events, concerts, and a variety of other programmes. Such cassettes can be either rented or bought.

Portable videotape recorders, which include a video camera, are used to make home movies. The camera sends audio and video signals through a cable to the recorder. In some portable videotape recorders, called *camcorders,* the camera and recorder are combined into a single unit.

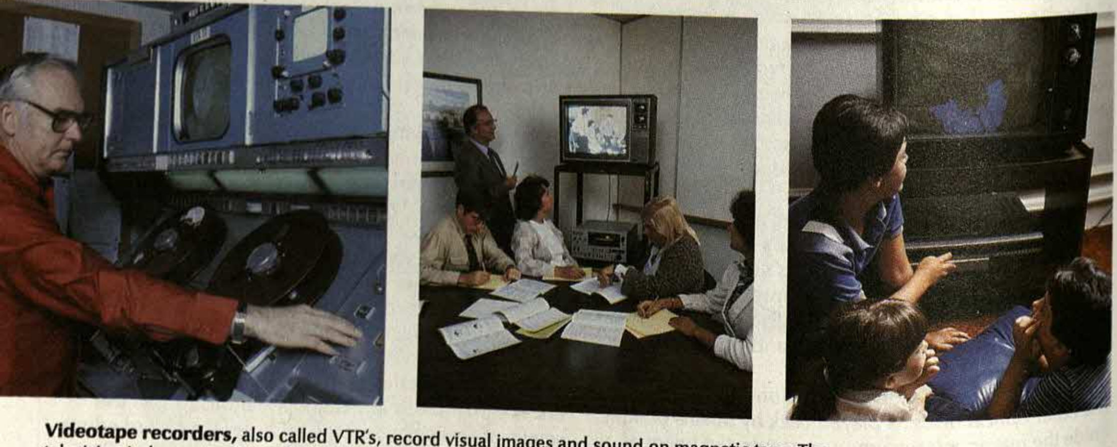
In schools, videotape recorders have become a valuable teaching aid. For example, teachers can videotape educational TV programmes and then play them back in class. In some schools, students use portable videotape recorders to produce their own educational programmes. Consultants who work in teaching hospitals or medical schools use videotape recordings to demonstrate surgical techniques.

In the television industry, videotape recorders have become essential equipment. Commercials, regular TV series, and many other television broadcasts are recorded on videotape. This practice allows programmers to plan and organize TV schedules ahead of time. It also enables broadcasters to show reruns of programmes and to replay commercials. In addition, most television news broadcasts feature reports recorded on tape.

In other industries, employers use videotape recorders chiefly to produce training films for employees. Salespeople sometimes study videotapes of their presentation to determine its effectiveness. Video cameras are used for surveillance in banks, laboratories, and other high-security areas.

How videotape recorders work

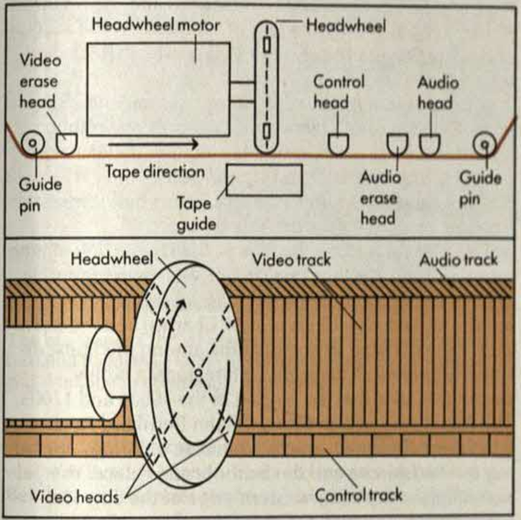
Recording. Videotape is a plastic strip covered with particles of iron oxide. As videotape travels through the videotape recorder, the recorder forms patterns of magnetization in the iron oxide. These patterns represent television signals. The recorder uses electricity and magnetism to form the patterns. It converts the TV signal into electric current, which travels through wire coils of small electromagnets called *heads.* A head is a ring of metal that has a narrow cut called a *gap.* Opposite the gap, a coil of wire is wrapped around the ring. This coil conducts the current corresponding to the TV signal. The current produces a strong magnetic field in the ring. This field also fills the space near the gap.



Videotape recorders, also called VTR's, record visual images and sound on magnetic tape. The television industry uses large professional VTR's, *above left,* to record and edit TV programmes. Semiprofessional VTR's, *centre,* act as a teaching aid in schools and businesses. Families use home recorders, commonly called VCR's, to play back various prerecorded tapes, *above right.*

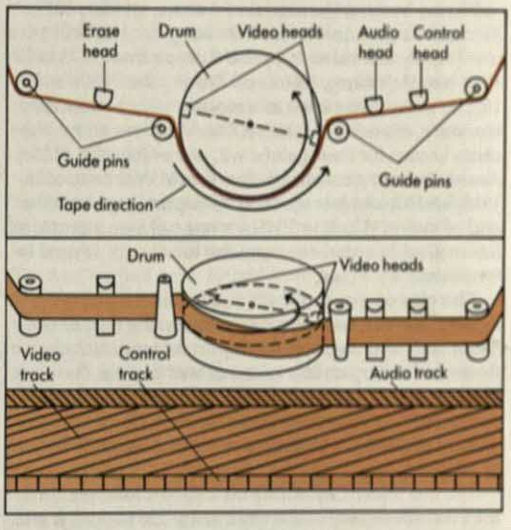
Transverse videotape recording

Most professional videotape recorders record video signals in *transverse* (vertical) tracks. Video tracks consist of adjoining regions of magnetized particles on the tape and are created by electromagnets called *video heads*. The video heads rotate on a *headwheel*. Separate heads record audio and control tracks.



Helical videotape recording

Semiprofessional and home videotape recorders record video signals in *helical* (diagonal) tracks on the tape. The video heads on a helical videotape recorder are mounted on a rotating cylinder called a *drum*. Most helical recorders are designed to use tape cassettes.



When videotape passes over the gap, the field creates the patterns of magnetization. The patterns remain until they are removed by an *erase head,* which demagnetizes the tape.

The patterns recorded on videotape consist of three types of *tracks* (lines of magnetized particles). Video tracks contain signals that carry the visual image. These tracks take up most of the tape. Audio tracks run along one edge of the tape, and control tracks along the other. Audio tracks contain signals that carry the television sound, and control tracks contain signals that prevent the recorded images from tilting or merging into one another when they appear on the TV screen.

Control tracks and audio tracks are recorded by stationary heads. Video tracks are recorded by video heads that are mounted on a rotating metal cylinder called a *drum* or a rotating metal disc called a *headwheel*. The video heads *scan* (pass over) the tape at high speed while recording or playing back video signals. Rapid scanning is necessary for the machine to capture and reproduce television signals, which have a high electrical frequency. If video heads were stationary, a large amount of rapidly moving videotape would be needed to record even a very small amount of televised information.

Most professional videotape recorders are equipped with a headwheel that records video tracks *transversely* (vertically) between edges of the tape. Semiprofessional and home VTR's record such tracks *helically* (diagonally) between edges of tape. In some modern machines, the video tracks are compressed to allow another audio channel to be recorded, allowing the reproduction of television programmes with stereophonic sound. Most professional recorders use a *supply reel* and a *take-up reel.* The supply reel feeds the tape through the recorder, past the various heads, and onto the take-up reel, where it is wound up. In semiprofessional and home videotape recorders, the supply and take-up reels are contained within a cassette.

Playback. As tape passes over the heads during playback, the tape's magnetic patterns create a varying magnetic field in the head. When the magnetic field reaches the wire coil, it is converted into electric voltages. The varying voltages pass as audio and video signals to a television set and are turned into sounds and pictures.

History

The development of videotape recorders began during the 1940's. However, the first videotape recorder that was capable of recording a television picture of broadcasting quality on magnetic tape was not invented until 1956. This reel-to-reel machine, produced by the Ampex Corporation of California, U.S.A., recorded transversely with a headwheel that had four video heads.

In 1959, the Toshiba Corporation of Japan introduced the first helical recorder. This VTR, which was smaller and less expensive than previous recorders, helped videotape recording spread outside the television industry. VCR's were first marketed in the early 1970's, chiefly for use in schools. The first commercially successful home videotape recorder did not appear until 1975. By the mid-1980's, two main types of home VCR systems had been developed. These two systems—called Beta and VHS—operated in basically the same manner, but tapes for one system could not be played on the other. In the mid-1980's, Sony Corporation of Japan introduced a third VCR system called *8mm*. The VCR accepts 8-millimetre tapes that are used in small, hand-held camcorders.

See also **Video camera**.

Vienna (pop. 1,515,666) is the capital and largest city of Austria. The city lies in northeastern Austria, on the south bank of the Danube River. For the location of Vienna, see **Austria** (political map). Vienna is Austria's leading cultural, economic, and political centre. The city's name in German is *Wien.*

Vienna became the capital of Austria, and later of Austria-Hungary, under the Habsburgs (or Hapsburgs), a royal family that ruled in central Europe from 1273 to 1918 (see **Habsburg, House of**). During the 1700's and 1800's, Vienna won fame as a world centre of education, literature, music, and science. The Viennese people became known for their gaiety, wit, and enjoyment of life. Austria-Hungary collapsed after World War I ended in 1918, and Vienna lost much of its importance. After the end of World War II in 1945, Vienna became a centre for international conferences and the location of several international agencies.

The city covers about 415 square kilometres at the eastern end of a narrow plain between the Carpathian Mountains and the Alps. An important mountain gap through the Carpathians is just east of Vienna. The city's location at this transportation crossroads played an important role in its growth and economic development. Trade and communication routes run through Vienna in all directions.

The old "Inner City" forms the centre of Vienna. This area includes many of the city's historical buildings and landmarks as well as its most fashionable shopping districts. The famous St. Stephen's Cathedral stands at the heart of the Inner City. Several streets west is the Hofburg, a palace that consists of both modern buildings and medieval structures. The palace includes the royal apartments, now occupied by the president of Austria; the Imperial Library; several museums; and the Spanish Riding School. Nearby lie two of Vienna's most beautiful parks, the Burggarten and the Volksgarten, which is famed for its rose trees.

Vienna, the capital of Austria, is a leading cultural centre of Europe. It is famous for its art galleries, churches, and theatres. The Burgtheater, *above,* is one of Vienna's many landmarks.

A band of streets called the Ringstrassen encircles the Inner City. Some of Vienna's most impressive public buildings line these streets. They include the Museum of Art History, City Hall, the Opera House, the Parliament Building, and the Stock Exchange. These buildings date from the second half of the 1800's.

The older suburban districts of the city lie outside the Ringstrassen. They became part of Vienna in the 1800's. Several important buildings are in the suburbs, including the Karlskirche (Church of St. Charles) and the Belvedere Palace. These structures rank among the finest existing examples of *baroque* architecture, a highly decorative style that developed in the 1600's and 1700's. The noted Austrian architect Johann Bernhard Fischer von Erlach designed several Viennese buildings, including the Karlskirche and the Schönbrunn Palace. The palace stands at the southwestern edge of the city. The Schönbrunn Zoo, which lies on the palace grounds, was built in 1752 and is the world's oldest zoo. A long park called the Prater lies north of Vienna along the Danube River. The Vienna Woods line the western edge of the city.

The people. Most Viennese are German-speaking Austrians. Many Czechs and Hungarians also live in the city, but nearly all of them speak German in addition to their national language. The Viennese wear Austrian folk costumes on special occasions.

Viennese foods reflect the mixture of nationalities in the city. Many of the people like to drink coffee and eat elegant pastries at pastry shops called *Konditoreien.* They also enjoy visiting the wine houses north of the city to drink freshly made wine, called *Heurigen.*

Most Viennese own or rent apartments in four- or five-storey buildings. Some suburban families own their own homes. The city authorities have built apartment complexes to replace residences that were destroyed during World War II, but housing shortages continue to be a problem.

Education and cultural life. Vienna is the home of many fine institutions of higher learning. They include the Academy of Fine Arts, the Academy of Music, the Technical University, and the University of Vienna (founded in 1365).

Vienna has long been known for its excellent museums and art galleries, including the Albertina and the Museum of Art History. It also has several libraries, among them the National Library, established in 1526. Musical events take place at such opera houses as the Musikverein, the State Opera House, and the Volksoper. The famous Vienna Boys' Choir sings every Sunday in the Hofburgkapelle, one of the city's churches. Major theatres include the Burgtheater, which is financially supported by the Austrian government, and the Theater in der Josefstadt.

The old "Inner City" of Vienna has many pavement cafes and beautiful buildings. People enjoy gathering at the cafes to eat and drink and to observe life around them.

A number of famous composers, scientists, and writers have lived in Vienna. Such composers as Ludwig van Beethoven, Johannes Brahms, Joseph Haydn, Wolfgang Amadeus Mozart, Franz Peter Schubert, and Johann Strauss all made their home there.

Economy. Vienna is Austria's chief industrial city. Its industries manufacture chemicals, clothing, leatherware, medicine, and radio and television products. The city has an excellent system of public transportation, with trams, elevated and underground trains, and buses. Most of the people use public transportation rather than private cars in the city.

History. Prehistoric tribes lived on the site of what is now Vienna. In 15 B.C., the Romans established a frontier post there named Vindobona. After the fall of the Roman Empire in the A.D. 400's, invading Germanic tribes took over the area. During the late 800's, the Magyars, a people from Hungary, gained control of the city, which by then was called Vienna. They lived there until the Germans conquered them in the mid-900's.

In 1273, a member of the Habsburg family became Holy Roman Emperor. The Habsburgs made Vienna their capital, and the city grew rapidly in wealth and importance. The Turks attacked Vienna in 1529 and again in 1683, but they failed to capture the city. Some of Vienna's most beautiful baroque palaces and churches were built during the 1700's.

After World War I, Vienna became the capital of the Austrian republic. German troops occupied Vienna from 1938 to the end of World War II in 1945. The city was badly damaged by Allied bombing during the war. From 1945 to 1955, the people lived under the control of the victorious Allies.

The Viennese rebuilt almost all the destroyed or damaged landmarks, and the city regained much of its former spirit and wealth. During the 1970's, new hotels were built and construction began on an expanded underground railway system. Also, a United Nations (UN) centre consisting of several buildings was constructed in Vienna. The centre opened in 1979. The centre serves as a UN conference site and provides office space for some UN agencies.

See also **Austria** (pictures); **Architecture** (Early modern architecture in Europe; pictures).

Vienna, Congress of, was a meeting held from late 1814 to early 1815 to settle the issues arising from almost 25 years of war between France and the rest of Europe. The congress decided how Europe would be ruled after the imminent defeat of the French emperor and military leader Napoleon I. The workable settlements made in Vienna, Austria, won credit for helping avoid any wide European conflict for 100 years afterward. See **Napoleon I.**

The chief decisions were made by representatives of the victorious Quadruple Alliance—Austria, Great Britain, Prussia, and Russia—and of France. The congress put back in power many European kings and princes. These rulers had been forced from power by Napoleon or by forces associated with the French Revolution (1789-1799). See **French Revolution.** The restored rulers included the Bourbon monarchs in Spain and in what is now southern Italy and the rulers of a number of states in Germany and northern Italy.

The congress also *ratified* (approved) several allied conquests. Britain retained a number of colonies it had seized during the fighting. Russia kept Finland and Bessarabia and won most of Poland. Austria and Prussia regained control of the remaining parts of Poland.

In addition, the congress tried to limit the power of France by placing strong countries on its borders. For example, it created the Kingdom of the Netherlands on the northeastern border of France by joining together Belgium, Holland, and Luxembourg. Prussia received German territories that bordered eastern France, and Austria gained major provinces in northern Italy.

The Congress of Vienna was bitterly criticized for many years because it ignored the strong democratic and nationalistic sentiments of many Europeans. These sentiments contributed to democratic revolutions in numerous European countries in 1830 and 1848 and to nationalistic movements in Germany and Italy. However, some historians of the 1900's have praised the Congress of Vienna for creating a balance of power in Europe and for not treating defeated France too harshly.

See also **Austria** (Metternich and revolution); **Germany** (The German Confederation); **International relations** (History); **Italy** (The French Revolution and Napoleon).

Vientiane (pop. 264,277) is the capital and largest city of Laos. Vientiane lies on the Mekong River near the border between Thailand and Laos (see **Laos** [map]). Vientiane is an important trading centre. It has an airport, and ferryboats link the city with a railway that runs south from nearby Nong Khai, Thailand, to Bangkok, Thailand. River transportation connects Vientiane with towns along the Mekong.

Vientiane formed part of the Kingdom of Lan Xang in the 1300's. During the 1700's, it became an independent kingdom. Siam (now Thailand) annexed the Kingdom of Vientiane in the early 1800's. The French made it part of Laos in 1893 and governed it as part of French Indochina until 1954, when Laos became an independent nation.

See also **Laos** (History); **Louangphrabang.**

Vietminh. See **Vietnam.**

James Pickerell, Black Star

The rice fields of Vietnam provide the basic food of the Vietnamese people. Most of the people in Vietnam are farmers, and rice is the chief crop.

Vietnam

Vietnam is a tropical country in Southeast Asia. It extends south from China in a long, narrow S-curve. Laos and Cambodia lie west of Vietnam, and the South China Sea lies to the east. Hanoi is the capital of Vietnam, and Ho Chi Minh City is the largest city.

Most Vietnamese live in villages on the coastal plain and on deltas formed by rivers. They grow rice and a few other crops on the fertile land. Many people who live near the coast catch fish for a living.

In ancient times, the Vietnamese people lived in what is now northern Vietnam. China ruled the area from about 100 B.C. until the A.D. 900's, when the Vietnamese formed an independent state. During the next 900 years, the Vietnamese expanded their territory until they controlled all of what is now Vietnam.

France gained control of Vietnam in the late 1800's. The French governed the country until Japan occupied it during World War II (1939-1945). After Japan's defeat in 1945, France tried to regain control of Vietnam. But the *Vietminh,* a group controlled by Communists and headed by Ho Chi Minh, gained power in northern Vietnam. Fighting broke out between French forces and the Vietminh in 1946. It ended in 1954, with the French defeat in the Battle of Dien Bien Phu and an international conference to arrange a peace settlement. The conference, held in Geneva, Switzerland, decided to divide Vietnam temporarily into two zones. The Communists received control of the northern zone, called North Vietnam. Non-Communist Vietnamese received control of the southern zone, called South Vietnam.

In 1957, Vietminh members in the South began to rebel against the South Vietnamese government. North Vietnam began publicly supporting the revolt in 1959.

Facts in brief about Vietnam

Capital: Hanoi.

Official language: Vietnamese.

Area: 331,689 km². *Greatest distances*— north-south, 1,657 km; east-west, 612 km. *Coastline*—3,444 km.

Elevation: *Highest*—Fan Si Pan, 3,143 m above sea level. *Lowest*—sea level along the coast.

Population: *Estimated 1996 population*—75,280,000; density, 227 people per km², distribution, 79 per cent rural, 21 per cent urban. *1989 census*—64,411,668. *Estimated 2001 population*—83,024,000.

Chief products: *Agriculture*—rice. *Manufacturing*—cement, fertilizer, iron and steel, paper products, textiles. *Mining*—coal.

Money: *Currency unit*—dong. One dong = 100 xu.

The Communists' goal was to unify the country under their control. The fighting developed into the Vietnam War. China, the Soviet Union, and other Communist countries sent aid to the Vietnamese Communists during the war. Non-Communist countries supported South Vietnam. The United States became the chief ally of the South. It backed the South's war effort with supplies and hundreds of thousands of troops. In 1973, the participants in the war agreed to a cease-fire and the United States withdrew its last combat troops. But the Communists soon resumed their war effort. In April 1975, the Communists defeated South Vietnam and took control of it. In 1976, they unified North and South Vietnam into the single nation of Vietnam. For more details of the conflict, see **Vietnam War**.

Government

Vietnam's leaders call the country a republic and a dictatorship of the working class. In practice, however, the government is tightly controlled by the leaders of the nation's Communist Party.

The Communist Party of Vietnam is headed by a Politburo of about 15 members. The Politburo is the most powerful governmental unit in Vietnam. It makes all the government's policies.

National government. Vietnam has a 496-member National Assembly. The Assembly meets twice a year to endorse laws and policies made by the Communist Party. A Council of State—made up of members of the National Assembly—deals with such matters as national defence and the execution of laws. The Council members make up a collective presidency. Members of a Council of Ministers head various departments of the government. The Communist Party chooses—and the National Assembly elects—the members of the Council of State and the Council of Ministers.

Local government. Vietnam is divided into 36 provinces, three cities independent of provinces, and one special zone. The cities are Haiphong, Hanoi, and Ho Chi Minh City. The Vung Tau-Con Dao special zone is southeast of Ho Chi Minh City. People's councils conduct government business at the provincial level and on down to the village level. Local government officials must follow Communist Party policies. The Communist Party chooses—and the people elect—the officials of the lower levels of local government. These officials elect the members of the higher levels of local government.

Courts. The Communist Party controls the court system of Vietnam. The system includes the People's Supreme Court, local people's courts, and military courts.

Armed forces. Vietnam has one of the world's largest armed forces. The entire force is called the People's Army of Vietnam (PAVN). It consists of an army of about 1,100,000 members; a small navy and air force; and paramilitary forces, such as a militia and border defence forces. About 2 million people serve in the paramilitary forces.

People

Thousands of years ago, people moved into the Vietnam area from the north and from islands to the south. The Vietnamese people probably developed out of these two groups. Today, they make up almost 90 per cent of Vietnam's population. Tay, Thai, Chinese, and Khmer are the largest minority groups in Vietnam.

Most Vietnamese people have broad faces, high cheekbones, and straight black hair. On average, the men stand a little over 150 centimetres tall and weigh about 54 kilograms. Most Vietnamese women are slightly smaller than the men.

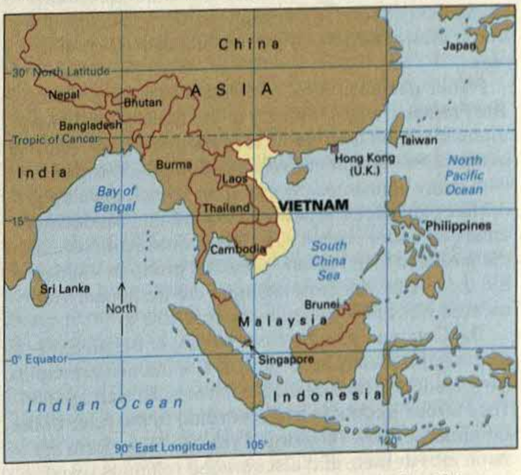
Most of the Vietnamese people live on the Mekong and Red river deltas and on the coastal plain. The Tay and Thai live mostly in the northern provinces. Thai people form a majority in nearby Thailand. The majority of the Chinese live in cities. Most of the Khmer are farmers in southwestern Vietnam. Khmer people make up a majority in neighbouring Cambodia.

Population. For Vietnam's total population, see the *Facts in brief* table with this article. The population includes about 1$\frac{1}{4}$ million Tay, 1 million Thai, 1 million Chinese, and 900,000 Khmer.

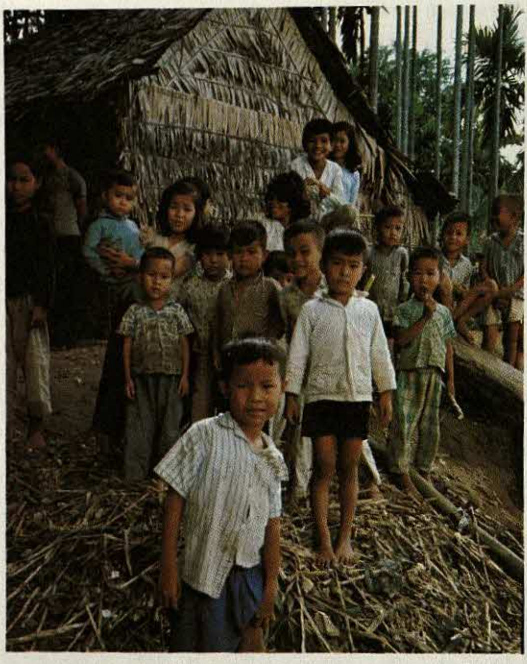
Ho Chi Minh City, with a population of about 4 million, is Vietnam's largest city. Hanoi, the next largest city, has a population of about 3 million. Haiphong, the third largest, has about 1$\frac{1}{2}$ million people.

Way of life. The Vietnamese way of life changed little for hundreds of years before the arrival of French colonists in the late 1800's. But since then, the influence of the French, the Communists, and the Americans, and

Vietnam's flag and coat of arms feature a star that stands for Communism. The rice and the cogwheel on the coat of arms represent the importance of agriculture and industry to Vietnam. The flag was adopted by North Vietnam in 1955.



Vietnam lies in Southeast Asia. It borders Cambodia, China, Laos, and the South China Sea.



Vietnamese children stand outside a village house in southern Vietnam. Most Vietnamese—like these children—have broad faces, high cheekbones, and straight black hair.

the years of war during the mid-1900's, have brought great changes.

Before the late 1800's, Vietnam was an agricultural society built on strong family ties. Almost all the people lived in villages and farmed the land. People owed loyalty to their families before all else, and held their families' interests above their own. The oldest male was head of the family, and his oldest son was the second most important family member. In many cases, related families lived together. These *extended families* included the parents, their unmarried children, and the oldest married son and his wife and children. Parents chose their children's marriage partners. Families honoured their ancestors by performing special ceremonies.

France gained control of Vietnam in the late 1800's. The French brought industry to the country, and many Vietnamese left their farms to work in the new factories in the cities. Agriculture was developed and expanded, with many Vietnamese working on French-developed rubber plantations. A new class of wealthy landowners emerged under French rule. They controlled more of the farmland than had any previous group in Vietnam. But the events that most changed the traditional Vietnamese way of life began in the mid-1900's.

The Communists who came to power began transforming the society according to Communist principles. Party leaders extended their control to all walks of life. They forced people to live according to the rules of the Communist Party. They urged women to perform the same jobs as men, and discouraged religious worship and the ceremonial honouring of ancestors.

The Vietnam War brought other changes to Vietnamese life. It broke up families as fathers and sons left home to fight. Hundreds of thousands of Vietnamese died in the war. In the north, areas near some cities were heavily bombed, forcing many people to move to the countryside. But almost all the ground fighting took place in rural areas of southern Vietnam. It drove many families from their farm homes to the somewhat safer cities. In the cities of the south, many people learned Western customs from U.S. business people, government workers, and soldiers who came to Vietnam because of the war.

Clothing. The people of Vietnam wear mostly cotton clothing. But the styles differ in northern Vietnam and southern Vietnam.

In cities of the north, most men and women wear plain black trousers with tightly buttoned white or dark-coloured jackets. Many people wear sandals made of worn-out car tyres. In cities of the south, some people wear the same style of clothing. But many people who have lived there since before the Communist take-over wear Western-style clothing, especially the men. Many women still wear the traditional Vietnamese *ao dai* (a long coatlike garment) over black or white trousers. In northern rural areas, most women dress in loose-fitting shirts and skirts. Some men wear coatlike garments that hang to the knees. Rural people in the south usually wear loose-fitting trousers and long-sleeved shirts.

Housing in rural areas differs in northern and southern Vietnam because of differences in climate. In the cooler north, many people traditionally built simple wood or bamboo houses with tiled roofs. In the warmer south, most families had homes with walls and roofs made of palm leaves or straw. But today, sheets of metal or plastic are often used for roofs. Wood, brick, and tile are common building materials in the towns and cities.

Food. Most Vietnamese eat chiefly fish, rice, and vegetables. Rice has long been the basic food in Vietnam. Most meals include a fish sauce called *nuoc mam.*

Language. Vietnamese is the official language of Vietnam. The people speak three major *dialects* (local forms) of Vietnamese—northern, central, and southern. But these dialects differ little from one another. Many members of the country's minority groups speak Vietnamese in addition to their own languages. There are dozens of minority-group languages. Many Vietnamese people, especially those living in the cities, can also speak English, French, Chinese, or Russian.

Education. After the division of Vietnam in 1954, both North and South Vietnam made special efforts to expand their educational systems. But the Vietnam War disrupted education, and the war effort used up money and materials that could have provided schools and teacher training. The Vietnamese economy has been extremely poor since the war ended, and the government has not been able to provide adequate funds for educational needs. In spite of such problems, most of the Vietnamese people can read and write.

The Communist Party controls the operation of all schools in Vietnam. The educational system includes general primary, junior, and secondary schools and vocational schools, which train skilled workers. Vietnam has 2 universities and more than 40 colleges and specialized schools. The University of Ho Chi Minh City is the largest college of higher education.

Religion. The Communist leaders of Vietnam discourage all religious practices. Most of the Vietnamese people who practise a religion are Buddhists. Many of them also worship the spirits of animals and plants and believe in the teachings of Confucianism and Taoism. About 10 per cent of the southern Vietnamese are Roman Catholics. Two small religious groups—the Hoa Hao and the Cao Dai—have developed since 1920 in the south. Hoa Hao is closely related to Buddhism. Cao Dai combines certain beliefs of Taoism and Buddhism with those of several other religions.

Arts. Poetry has long been the most popular and powerful form of literature in Vietnam, and poets have always been highly respected. Most people can recite at least a few verses of "Kim Van Kieu," a poem that deals with love and sacrifice. This work of more than 3,000 lines was written by the poet Nguyen Du, who lived during the late 1700's and early 1800's.

Novels began to gain wide popularity in Vietnam during the years of French rule. They remain popular, especially in the south. But the Communist leaders now carefully regulate the books the people may read.

Vietnamese painting shows the influence of both ancient Chinese and modern French art. Examples of traditional Vietnamese architecture include mostly *pagodas* (temples), tombs, and old royal palaces.

Land and climate

Vietnam occupies the east coast of the Indochinese Peninsula. The Vietnamese sometimes describe their country as two rice baskets hanging from opposite ends of a farmer's carrying pole. In the north, the Red River Delta forms one "basket." The Mekong Delta in the south forms the other. A narrow stretch of land in central Vietnam forms the "carrying pole" that connects the two river deltas.

The market places of Ho Chi Minh City, Vietnam's largest city, are crowded with peddlers. Many of them display their produce and other goods on the pavements in front of shops.

Vietnam extends about 1,600 kilometres from China south to the Gulf of Thailand. At its widest point—in the north—Vietnam extends almost 650 kilometres from Laos to the Gulf of Tonkin. At its narrowest point—in central Vietnam—it is only about 50 kilometres wide.

Vietnam has five main land regions: (1) the Northern Highlands, (2) the Red River Delta, (3) the Annamite Range, (4) the Coastal Lowlands, and (5) the Mekong Delta.

The Northern Highlands are a mountainous region in northwestern Vietnam. The highlands extend into China and Laos. Forests or jungles cover most of the mountains in this thinly populated region. The highest peak in Vietnam, Fan Si Pan, rises 3,143 metres above sea level in the highlands.

The Red River Delta extends from the Northern Highlands to the Gulf of Tonkin. It has been formed by the Red River, which flows from southern China through northern Vietnam into the gulf. Most of the delta lies 3 metres or less above sea level. The Red River floods much of this densely populated region almost every year. The Red River Delta is northern Vietnam's chief farming area.

The Annamite Range is a chain of mountains. It runs through western Vietnam from the Northern Highlands to about 80 kilometres north of Ho Chi Minh City. Forests cover most of the mountains. Like the highlands, these mountains are thinly populated. Most of the people in this region are Montagnards.

The Coastal Lowlands occupy east-central Vietnam. The lowlands slope from the mountains to the South China Sea and extend from the Red River Delta to the Mekong Delta. Rice is grown throughout most of the region. Many people who live along the coast are fishermen. The lowlands are thickly populated.

The Mekong Delta covers all of Vietnam south of the Annamite Range and the Coastal Lowlands. It has been formed by the Mekong River, which flows from China through Southeast Asia into the South China Sea. The Mekong Delta, like the Red River Delta, lies 3 metres or less above sea level. Over half the people of southern Vietnam live on the delta. It is the chief agricultural area of Vietnam. See **Mekong River.**

Climate. Vietnam has a tropical climate. *Monsoons* (seasonal winds) affect the weather throughout the year. The summer monsoon brings heavy rains from the southwest. The winter monsoon brings lighter rainfall from the northeast. Most of Vietnam has two seasons—a wet, hot summer and a drier, slightly cooler winter. However, some areas of northernmost Vietnam have four seasons.

In Hanoi, in northern Vietnam, the average temperature is about 17° C in January and about 29° C in June. From May to October, the Red River Delta has high temperatures, heavy rains, and some typhoons, which sweep across the Gulf of Tonkin. Hanoi receives about 185 centimetres of rainfall a year.

In southern Vietnam, the humidity remains high throughout the year. Most rain falls in summer. The Ho Chi Minh City area receives about 200 centimetres of rain between April and November. From December to March, the weather is cooler with little rain. The average temperature in Ho Chi Minh City ranges from about 26° C in December to about 30° C in April.

Central Vietnam includes both the driest and the wettest regions of the country. It also has a greater temperature range than the north and south. Typhoons often strike the central coast. Mountain areas in Vietnam generally have lower temperatures and more rainfall than the delta regions and the Coastal Lowlands.

Economy

The economy of Vietnam depends on agriculture. About 70 per cent of the workers are farmers, and agricultural goods—especially rice—are the country's chief products. Vietnam has a socialist economy, in which the government owns most means of production. In the late 1980's, however, the government began an economic restructuring that encouraged some forms of private enterprise and competition.

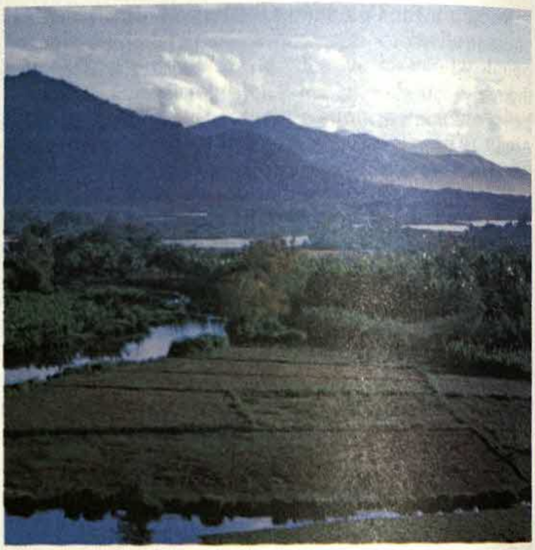
Northern Vietnam has most of the country's natural resources. *Anthracite* (hard coal) is the chief mineral resource, and the north has almost all the anthracite fields. Vietnam also mines chromium, clays, petroleum, phosphates, salt, and tin. Forests cover one-third of Vietnam. Forest products include bamboo, cinnamon, quinine, and timber.

Agriculture. About 15 per cent of the land in Vietnam is used for farming. About another 20 per cent of the land in the south is suitable for farming, but remains mostly uncultivated. The government is working to develop more farmland. Rice is the chief farm product of Vietnam. Other products include cassava, coffee, coconuts, cotton, jute, maize, peanuts, soybeans, sugar cane, sweet potatoes, tea, tobacco, and rubber.

The fishing industry is also important to Vietnam's economy. Many people who live on the coast earn their living from the fishing industry. The seafood caught includes lobster, shrimp, squid, and many kinds of fish.

Manufacturing. Vietnam lacks the natural resources needed for heavy industry. The country has a small iron and steel industry. The Vietnamese use the iron and steel to manufacture farm tools, bicycles, and simple machinery. Vietnam also has cement, fertilizer, food-processing, paper, and textile industries.

Foreign trade. Vietnam's imports include petroleum products, medicines, machinery, military supplies, vehicles, and food. Its major exports are coal, peanuts, rice, rubber, tea, and handcrafted bamboo and rattan products. Hong Kong, Japan, and Singapore are Vietnam's chief trading partners.



The Coastal Lowlands extend along much of Vietnam's seacoast. A chain of mountains called the Annamite Range rises in the background beyond the western edge of the lowlands.

Transportation and communication. Vietnam has an extensive transportation system that includes roads and railways. The Red River and its branches, and the Mekong River and its branches, are important waterways.

The bicycle ranks as the chief means of private transportation in northern Vietnam. It is also important in the south, but motor scooters are also widely used there. Less than 1 per cent of the people own cars.

Many newspapers are published in Vietnam. Before the 1960's, few Vietnamese owned a radio or a TV set. In the 1960's and 1970's, ownership of radios—and to a lesser extent TV sets—became fairly widespread in southern Vietnam. In northern Vietnam, few people own either a radio or TV set. Most rural people live in villages and listen to radio programmes over public loudspeakers. Most of the TV sets are owned by collective farms, workers' organizations, or similar groups.

Vietnam's Communist Party has controlled all means of communication since it came to power. It does so to promote loyalty to the party and to curb opposition.

Vietnam map index

Provinces*

An Giang	1,793,000	J	2
Bac Thai	1,033,000	B	3
Ben Tre	1,214,000	J	3
Binh Tri Thien	1,995,000	E	3
Cao Bang	566,000	A	3
Cuu Long	1,812,000	J	3
Dac Lac	974,000	H	4
Dong Nai	2,007,000	I	3
Dong Thap	1,337,000	I	2
Gia Lai-Kon Tum	873,000	G	4
Ha Nam Ninh	3,157,000	C	3
Ha Bac	2,061,000	B	3
Ha Son Binh	1,840,000	B	2
Ha Tuyen	1,026,000	A	2
Hai Hung	2,440,000	B	3
Hau Giang	2,682,000	J	3
Hoang Lien Son	1,032,000	A	1
Kien Giang	1,198,000	J	2
Lai Chau	438,000	A	1
Lam Dong	639,000	I	4
Lang Son	611,000	B	3
Long An	1,121,000	I	3
Minh Hai	1,562,000	K	2
Nghe Tinh	3,582,000	D	2
Nghia Binh	2,288,000	E	3
Phu Khanh	1,463,000	H	5
Quang Nam-Da Nang	1,739,000	F	4
Quang Ninh	814,000	B	3
Son La	682,000	B	1
Song Be	939,000	I	3
Tay Ninh	791,000	I	3
Thai Binh	1,632,000	C	3
Thanh Hoa	2,991,000	C	2
Thuan Hai	1,170,000	I	4
Tien Giang	1,484,000	J	3
Vinh Phu	1,806,000	B	2
Vung Tau-Con Dao (special zone)	136,000	J	3

Cities and towns

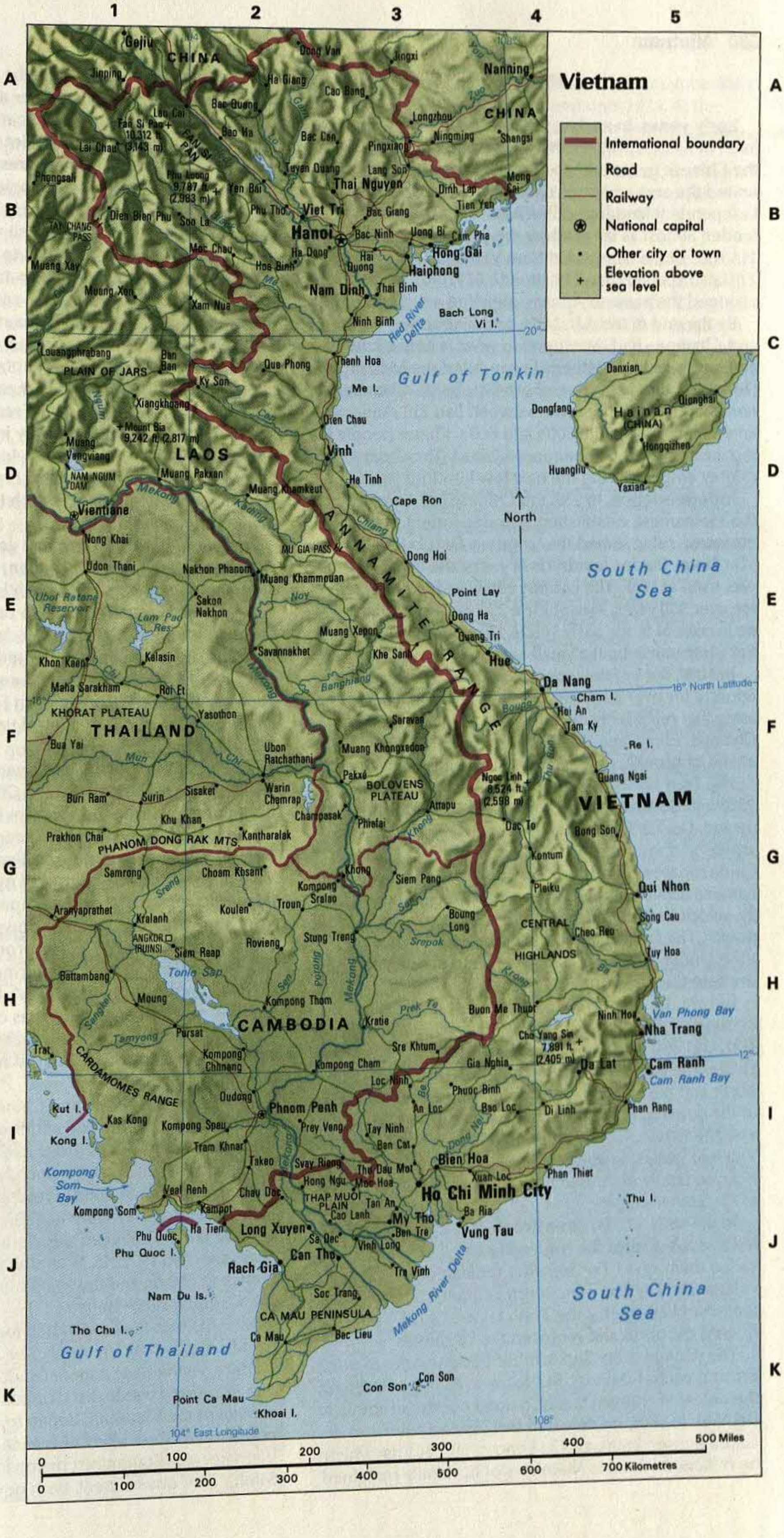
An Loc	15,276	I	3
Ap Phuoc Tuy*	16,419	I	3
Ba Ria		J	3
Bac Can		A	3
Bac Giang	66,349	B	3
Bac Lieu	53,841	K	3
Bac Ninh	45,137	B	3
Bac Quang		A	2
Bao Ha		A	2
Bao Loc	17,774	I	4
Ben Cat		I	3
Ben Tre	65,424	J	3
Bien Hoa	313,868	I	3
Bien Son*	29,482	C	3
Bong Son		G	5
Buon Me Thuot	176,429	H	4
Ca Mau	67,484	K	2
Cam Pha	108,656	B	3
Cam Ranh	118,111	I	5
Can Tho	285,083	J	2
Cao Bang	30,917	A	3
Cao Lanh	16,482	J	3
Chau Doc	76,652	J	2
Cheo Reo	6,195	H	4
Con Son	3,143	K	3
Da Lat	116,139	I	4
Da Nang	370,670	F	4
Di Linh		J	4
Dien Bien Phu	124,596	B	1
Dong Ha	29,603	D	3
Dong Hoi	63,441	E	3
Gia Nghia	4,526	I	4
Go Cong*	36,248	I	3
Ha Dong	81,632	B	3
Ha Giang		A	2
Ha Tien		J	2
Ha Tinh		D	3
Hai Duong	95,899	B	3
Haiphong	1,447,649	B	3
Ham Tan*	19,323	J	4
Hanoi	3,058,855	B	3
Ho Chi Minh City	3,934,395	J	3
Hoa Binh	54,850	B	2
Hoi An	64,714	F	4
Hong Gai	115,312	B	3
Hue	362,696	E	4
Khanh An*		K	2

*Do not appear on map; key shows general location.
Sources: 1989 census for provinces and largest cities, 1979 census and official estimates (1970-1973) for other places.

Khiem Cuong*	6,839	J	3
Kontum	67,616	G	4
Lang Son	38,127	B	3
Lao Cai	23,721	A	2
Loc Ninh		I	3
Long Xuyen	185,221	J	2
Moc Hoa	3,191	I	3
My Tho	149,330	J	3
Na Sam*		B	3
Nam Dinh	219,607	C	3
Nha Trang	263,637	H	5
Ninh Binh		C	3
Phan Rang	33,377	I	5
Phan Thiet	93,219	I	4
Phu Giao		I	3
Phu Quoc		J	1
Phu Tho	39,719	B	2
Phuoc Binh	20,543	I	3
Pleiku	92,470	G	4
Quang Ngai	14,119	F	4
Quang Trach		D	3
Quang Tri	458,000	E	3
Quang Yen*		B	3
Qui Nhon	202,230	G	5
Rach Gia	106,675	J	2
Sa Dec	73,104	J	2
Saigon, see Ho Chi Minh City			
Soc Trang	74,967	J	3
Son La	36,585	B	1
Son Tay*		B	2
Song Cau		H	5
Tam Ky	38,532	F	4
Tan An	43,364	J	3
Tay Ninh	32,151	I	3
Thai Binh	79,566	C	3
Thai Nguyen	173,113	B	3
Thanh Hoa	114,928	C	3
Thu Dau Moi	99,426	I	3
Tien Yen		B	3
Tra Vinh	55,403	J	3
Tung Nghia*	14,350	I	4
Tuy Hoa	63,667	H	5
Tuyen Quang	38,998	B	2
Uong Bi	69,771	B	3
Vi Thanh*	20,694	J	2
Viet Tri	116,140	B	2
Vinh	174,830	D	3
Vinh Long	94,692	J	3
Vinh Yen*	30,238	B	2
Vung Tau	88,978	J	4
Xuan Loc	25,071	I	4
Yen Bai	51,148	B	2

Physical features

Annamite Range	E	3
Ba River	H	4
Bach Long Vi Island	C	4
Be River	I	3
Black River	B	2
Boung River	F	4
Ca Mau Peninsula	J	2
Can River	D	2
Cam Ranh Bay	I	5
Cape Ron	D	3
Central Highlands	H	4
Cham Island	F	4
Chiang River	D	3
Chu Yang Sin (peak)	H	4
Con Son (islands)	K	3
Dong Nai River	I	3
Fan Si Pan (peak)	A	1
Gam River	A	2
Gulf of Thailand	K	1
Gulf of Tonkin	C	3
Khoai Island	K	2
Krong River	H	4
Lo River	A	2
Ma River	C	2
Me Island	C	3
Mekong River Delta	J	3
Nam Du Islands	J	2
Ngoc Linh (peak)	F	4
Phu Luong (peak)	B	2
Phu Quoc Island	J	1
Point Ca Mau	K	2
Point Lay	E	3
Re Island	F	4
Red River	B	2
Red River Delta	C	3
South China Sea	E	5
Tay Chang Pass	B	1
Thap Muoi Plain	J	3
Tho Chu Island	K	1
Thu Ban River	F	4
Thu Island	J	4
Van Phong Bay	H	4



History

Early years. In ancient times, the Vietnamese people lived in what is now northern Vietnam. About 200 B.C., the Chinese general Zhao Tuo, also known as Trieu Da, united the area and parts of southeastern China into an independent kingdom called *Nam Viet.* The kingdom extended almost as far south as the present city of Hue. In 111 B.C., China conquered Nam Viet and renamed it *Jiao Zhi* (also spelled Giao Chi). In A.D. 679, the Chinese changed the name to *Annam,* meaning *pacified south.*

By the end of the A.D. 100's, two kingdoms—Funan and Champa—had developed in what is now southern and south-central Vietnam. Funan ruled the Mekong Delta and what is now southern Cambodia. Champa controlled central Vietnam between Jiao Zhi (Annam) and Funan. During the 500's and 600's, Khmer people living west of Champa conquered Funan. They built a mighty empire during the next few hundred years.

Independence. In 939, the Chinese left Annam, and the Vietnamese established an independent state. A Vietnamese ruler named the kingdom *Dai Co Viet* (Great Viet State). But for hundreds of years, the name Annam was used as well. The country remained independent for over 900 years, except for a 20-year period of Chinese control in the early 1400's. During those 900 years, the Vietnamese built a small empire.

In 1009, the Ly family came to power. It ruled the country for over 200 years. The Ly rulers built a strong army that repeatedly defeated attacking forces from Champa, China, and the Khmer empire. The period was a time of growth, prosperity, and artistic achievement.

The Tran family seized power from the Ly rulers in 1225 and governed the country until 1400. During that period, Dai Co Viet defeated several attacking Mongol armies and fought almost continuously with Champa. China regained control of Dai Co Viet in 1407. The Vietnamese drove out the Chinese in 1427, and the Le family, which had led the fight against China, came to power. The family named the country *Dai Viet* (Great Viet). Under their rule, Dai Viet gained prosperity. Le rulers held the throne until 1787.

In 1471, Le Thanh Ton, the strongest of the Le rulers, conquered Champa. But weak rulers followed Le Thanh Ton, and civil war broke out in Dai Viet during the 1500's. The war began as two families—the Trinh in the north and the Nguyen in the south—fought for control of the country. Both sides claimed to support the Le rulers. The families finally stopped fighting in 1673, and Dai Viet had peace for about 100 years. During that time, the Nguyen family expanded their territory by seizing parts of the Khmer empire.

In the early 1770's, three brothers in central Dai Viet led a revolt against the Nguyen family. The brothers called themselves *Tay Son* after the name of their home village. The Tay Son conquered southern Dai Viet and then marched against the Trinh family. In 1787, they conquered the north and removed the Le rulers.

The youngest Tay Son brother became ruler of northern and central Dai Viet. But Nguyen Anh, a member of the defeated Nguyen family, gained control of southern Dai Viet. In 1802, he defeated the Tay Son ruler and declared himself Emperor Gia Long of all Dai Viet, which he renamed *Vietnam.* Members of his family remained the emperors of Vietnam until the end of World War II in 1945. But they had little power after the mid-1800's.

French rule. Roman Catholic missionaries from France began to arrive in Dai Viet in the 1600's. They converted thousands of Vietnamese to Catholicism, but the country's rulers became suspicious of the missionaries. From the 1600's until the early 1800's, Vietnamese rulers continually persecuted the missionaries.

In 1858, French forces began to attack parts of southern Vietnam. France acted partly to stop the persecution of the missionaries and partly because it wanted to become a colonial power in Vietnam. The French seized Saigon (now Ho Chi Minh City) in 1861 and the rest of the south by 1867. They took control of northern Vietnam by 1883. That year, the French forced the Nguyen ruler to sign a treaty that gave France control of all Vietnam. France divided the country into three areas—*Cochin China* (southern Vietnam), *Annam* (central Vietnam), and *Tonkin* (northern Vietnam). France governed the areas as separate parts of French Indochina, which also included Cambodia and Laos.

Japanese control. Germany defeated France early in World War II, in June 1940. Japan, one of Germany's allies, soon took control of French Indochina. The Japanese allowed French officials to remain in Vietnam, but they had to govern according to Japan's wishes. Then, in March 1945, the Japanese arrested all French officials and forced Emperor Bao Dai to announce the independence of Annam and Tonkin from France. Vietnam remained under Japanese control until Japan's defeat in August 1945.

The Indochina War. The Japanese defeat left no group in power in Vietnam. Ho Chi Minh, a Vietnamese Communist, returned to Vietnam from China. He was the head of the Revolutionary League for the Independence of Vietnam, commonly called the *Vietminh.* The Vietminh swiftly took control of many areas of the country, particularly in the north. Emperor Bao Dai, unable to form a government, stepped down in favour of Ho Chi Minh. In September 1945, Ho proclaimed Vietnam independent and announced the formation of the Democratic Republic of Vietnam (DRV). Ho became head of the new government, which was controlled by the Communist Vietminh, but supported by many non-Communist nationalists who did not want a return to French colonial rule.

Within weeks, British and Chinese troops arrived in Vietnam to accept the surrender of the Japanese. These troops also established order and had the effect of holding onto Vietnam for the French, whose first forces soon arrived. The French quickly reestablished control of Cochin China. But they were not able to put down all resistance. Relations between the Vietminh and France worsened. On Dec. 19, 1946, Vietminh forces attacked the French in Hanoi, and the Indochina War—also known as the Vietminh War—began.

By mid-1949, the French had formed the State of Vietnam to oppose the Vietminh. The State of Vietnam was led by a Vietnamese nationalist government headed by Bao Dai. Many nationalists, opposed to the Communist control of the Vietminh, began to support the new government. Western allies of France supported the State of Vietnam, and Communist nations supported Ho Chi Minh's DRV government. Both governments claimed to represent all of Vietnam. In 1953, the Communists began to take control of the farmland in northern Vietnam. They killed or imprisoned landowners they considered their enemies and assigned production quotas to all farmers.

The division of Vietnam. In April 1954, representatives of the DRV, the State of Vietnam, Cambodia, Laos, China, France, Great Britain, the Soviet Union, and the United States met in Geneva, Switzerland, to arrange a peace settlement for Vietnam. The fighting in Vietnam and France's claim to the area ended in May 1954, when the Vietminh defeated the French in the Battle of Dien Bien Phu. The representatives at the Geneva Conference then decided to divide Vietnam temporarily into two parts, North Vietnam and South Vietnam. The conference also called for elections in 1956 to unite Vietnam under one government. See **Geneva Accords.**

Ho Chi Minh became president of North Vietnam. Bao Dai was head of South Vietnam. In 1955, the people of South Vietnam chose Ngo Dinh Diem as their leader. Diem then established the Republic of Vietnam with himself as president. He refused to go along with the elections planned for 1956, claiming the Communists would not permit fair elections. Vietnam remained divided.

The Vietnam War begins. In 1957, Vietminh members in South Vietnam began to rebel against Diem's rule. These rebels became known as the *Viet Cong.* In 1959, North Vietnam publicly supported the revolt. It ordered the Viet Cong to begin an armed struggle against the South Vietnamese government. In 1960, the Viet Cong were organized into the National Liberation Front, which was formed to lead the revolt. Gradually, the war grew larger and more intense.

The United States had sent civilian and military advisers to help the South Vietnamese in the 1950's. In early 1965, the U.S. began sending ground combat troops to Vietnam and began bombing North Vietnam. American participation in the war continued until 1973. At the same time, China and the Soviet Union sent arms and supplies to North Vietnam and the Viet Cong.

South Vietnam and the war. President Diem signed a new constitution into law in 1956. It declared that South Vietnam was a republic. But Diem and his family actually controlled the government.

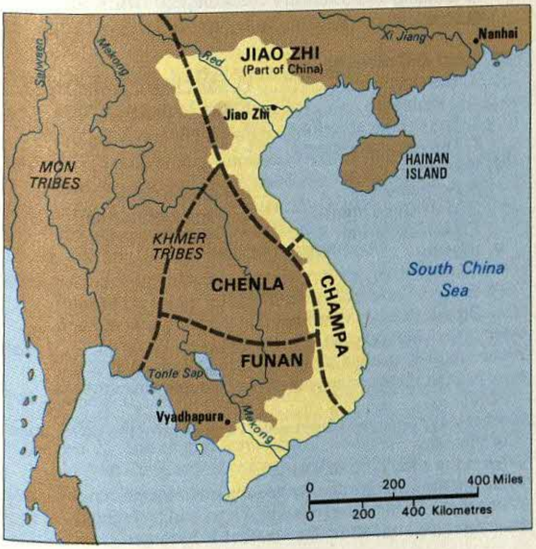
Viet Cong attacks in South Vietnam increased during the late 1950's and early 1960's. Diem turned more and more to undemocratic policies to combat the Communists, and South Vietnamese political leaders began to criticize the Diem government. In 1962, Diem declared a national emergency. He established a curfew, the censorship of news, and other restrictions.

Important dates in Vietnam

111 B.C.	The Chinese conquered what is now northern Vietnam.
A.D. 939	China ended its rule over the Vietnamese, who then set up an independent state.
1802	Nguyen Anh united the country and called it *Vietnam.*
1858-1883	France took control of Vietnam.
1940-1945	Japan controlled Vietnam during World War II.
1946	War began between France and the Vietminh.
1954	The Vietminh defeated the French. The Geneva Conference divided Vietnam into two nations.
1957	The Viet Cong began to rebel against the South Vietnamese government. The fighting developed into the Vietnam War.
1973	U.S. participation in the Vietnam War ended.
1975	The Vietnam War ended on April 30, when South Vietnam surrendered to the Communists.
1976	The Communists unified North and South Vietnam into the nation of Vietnam.
1978	Vietnam invaded Cambodia and helped pro-Vietnamese Cambodians gain control of the government.
1989	Vietnam claimed to have withdrawn all its troops from Cambodia, but some people believed troops remained.

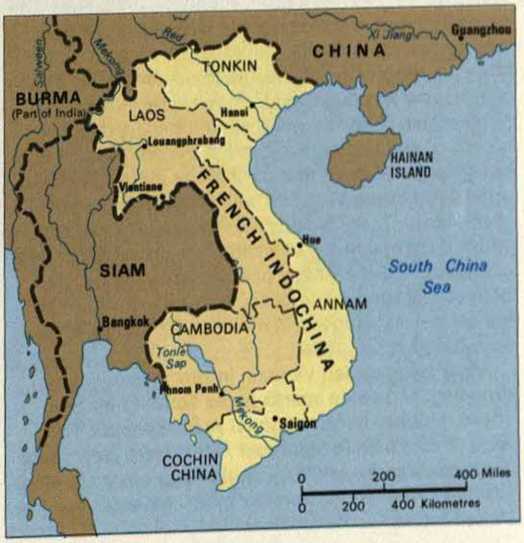
The Indochina Peninsula about A.D. 300

This map shows the early states of Indochina. Jiao Zhi was an independent kingdom called *Nam Viet* before it was conquered by China in 111 B.C. Present-day Vietnam is shown in yellow.



The Indochina Peninsula in 1900

This map shows French Indochina, which included Cambodia, Laos, and Vietnam. France divided Vietnam into Tonkin, Annam, and Cochin China. Present-day Vietnam is shown in yellow.



On Nov. 1, 1963, a group of army generals led by Duong Van Minh seized the South Vietnamese government. Diem was murdered. A series of military groups held power for brief periods until June 1965. A group led by Nguyen Cao Ky, an air force general, then took control. In 1967, Nguyen Van Thieu, an army general, was elected president. Meanwhile, the war grew into a major conflict and battles raged in South Vietnam.

In June 1972, the National Assembly gave Thieu power to rule by *decree* (presidential order) for six months. In August, Thieu ruled that almost all hamlet and village officials would no longer be elected but would be appointed by the national government. This decree ended most local elections in South Vietnam.

North Vietnam and the war. After the division of Vietnam, the Communists completed a take-over of all farms, factories, and other businesses in the North. During the 1960's and early 1970's, North Vietnam concentrated more and more of its agricultural and industrial efforts in support of the war.

Ho Chi Minh served as North Vietnam's president until he died in 1969. Control of the government then passed to the Politburo of the Communist Party.

Communist victory and unification. After 1965, South Vietnam depended more and more on American support in its war against the Communists. Beginning in the late 1960's, American involvement in Vietnam became increasingly unpopular in the United States. In early 1973, South Vietnam, the United States, and the Communists signed a cease-fire agreement, and the United States removed its last ground troops from Vietnam. But the Communists soon launched another offensive against South Vietnam. In April 1975, Saigon, the capital of South Vietnam, fell to the Communists, and the Communists gained control of the South. For more details on the conflict, see **Vietnam War.**

In 1976, the Communists unified North and South Vietnam into the single nation of Vietnam. Communist officials from the North took control of the government of the unified country. They changed the name of Saigon to Ho Chi Minh City.

Recent developments. Since the end of the Vietnam War, Vietnam has faced great economic difficulties. The country's extreme poverty, along with dissatisfaction with certain government programmes, have caused large numbers of people to flee the country. One such programme was designed to move large numbers of people from cities to rural areas to relieve urban overcrowding and unemployment. But the programme was poorly planned and carried out. It has met widespread opposition by the people. Another government programme sent many southerners to "reeducation" camps, which were essentially concentration camps for political prisoners. About a million people, including people both of Vietnamese and of Chinese ancestry, have left the country as refugees. In addition, thousands of Chinese have been expelled.

Many refugees left Vietnam in small boats, risking drowning and pirate attacks in the South China Sea. These refugees became known as *boat people.* They went to countries in Southeast Asia, where they stayed in refugee camps until they could be relocated in other countries. The largest number by far moved to the United States.

Another major development since the end of the war has been troubles between Vietnam and neighbouring countries. In 1978, Vietnam invaded Cambodia. It replaced Cambodia's Khmer Rouge Communist government with a pro-Vietnamese Communist government. The Khmer Rouge Communists, along with non-Communist groups, then fought a guerrilla war against the new government and the Vietnamese forces who occupied Cambodia. The war ended in 1991. Vietnam gradually withdrew its troops during the 1980's, and claimed a complete withdrawal by September 1989. But some people claimed that some Vietnamese troops never left. It was also said that some troops returned to Cambodia later.

In 1979, Chinese forces occupied Vietnam's northern border area for about a month in an effort to punish the Vietnamese for invading Cambodia. Friction, including border clashes from time to time, continued between Vietnam and China for many years. In the early 1990's, relations between the two countries improved.

In the late 1980's, the government began a programme of economic restructuring. This programme encouraged some forms of private enterprise and competition. In 1994, the United States lifted its 30-year trade embargo on Vietnam.

Related articles in ***World Book*** include:

Clothing (picture: Traditional costumes)
Da Nang
Dien Bien Phu, Battle of
Geneva Accords
Haiphong
Hanoi
Ho Chi Minh
Ho Chi Minh City
Hue
Indochina
Mekong River
Ngo Dinh Diem
Southeast Asia
Southeast Asia Treaty Organization
Vietnam War

Outline

- **I. Government**
  - A. The Communist Party
  - B. National government
  - C. Local government
  - D. Courts
  - E. Armed forces
- **II. People**
  - A. Population
  - B. Way of life
  - C. Clothing
  - D. Housing
  - E. Food
  - F. Language
  - G. Education
  - H. Religion
  - I. Arts
- **III. Land and climate**
  - A. The Northern Highlands
  - B. The Red River Delta
  - C. The Annamite Range
  - D. The Coastal Lowlands
  - E. The Mekong Delta
  - F. Climate
- **IV. Economy**
  - A. Agriculture
  - B. The fishing industry
  - C. Manufacturing
  - D. Foreign trade
  - E. Transportation and communication
- **V. History**

Questions

How did the Vietnam War begin?
What is the chief religion of Vietnam?
What nation controlled Vietnam during World War II?
How has the Vietnamese way of life changed since the late 1800's?
In what ways does the Communist Party control the government of Vietnam?
What is the chief crop of Vietnam?
What are the largest minority groups in Vietnam?
When was Vietnam controlled by China and by France?
How do monsoons affect the weather in Vietnam?

Vietnam War was a major conflict in Southeast Asia. The war began as a civil war to decide the government of Vietnam. It developed into a major international conflict, involving the United States in the longest war in which Americans have taken part. It began in 1957 and ended in 1975. Vietnam, a small country in Southeast Asia, was divided into Communist-ruled North Vietnam and non-Communist South Vietnam. North Vietnam and Communist-trained South Vietnamese rebels fought to take over South Vietnam. The United States and the South Vietnamese army tried to stop them but failed.

The Vietnam War was actually the second phase of fighting in Vietnam. During the first phase, which began in 1946, the Vietnamese fought France for control of Vietnam. At that time, Vietnam was part of the colony of French Indochina. The Vietnamese defeated the French in 1954. Then Vietnam was divided into North and South Vietnam.

The Communists called the Vietnam War *a war of national liberation.* They saw it as an extension of the struggle with France and as another attempt by a foreign power to rule Vietnam. North Vietnam wanted to end U.S. support of South Vietnam and to unite the north and south. China and the Soviet Union, at that time the two largest Communist nations, gave the Vietnamese Communists war materials but not troops.

U.S. aid to non-Communist South Vietnam was based on a fear that if one Southeast Asian nation fell to the Communists, the others would also fall, one after the other, "like a row of dominoes."

The Vietnam War had several periods. From 1957 to 1965, it was mainly a struggle between the South Vietnamese army and Communist-trained South Vietnamese rebels known as the Viet Cong. From 1965 to 1969, North Vietnam and the United States did much of the fighting. Australia, New Zealand, the Philippines, South Korea, and Thailand also helped South Vietnam. The United States began to withdraw its forces in 1969. In January 1973, a cease-fire was arranged. The last American ground troops left Vietnam two months later. The fighting began again soon afterward. The war ended when South Vietnam surrendered on April 30, 1975.

Background to the war. Vietnam, Laos, and Cambodia made up the French colony of Indochina from the late 1800's to the 1940's (see **Indochina**). Japan occupied Indochina during most of World War II (1939-1945). France tried to reestablish control after Japan's defeat in 1945. But Ho Chi Minh, a Vietnamese patriot and Communist, organized a revolt in northern Vietnam, and declared Vietnam independent. See **Ho Chi Minh.**

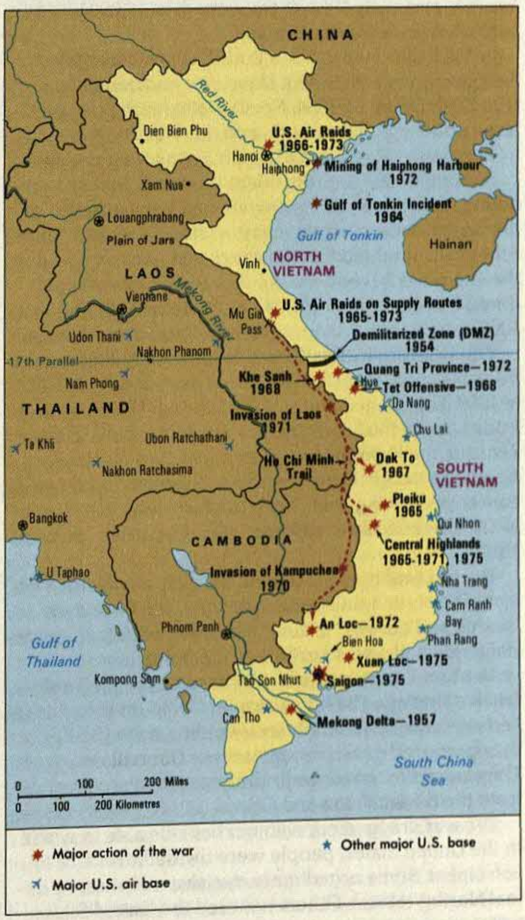
Important dates in the Vietnam War

1957	The Viet Cong began to rebel against the South Vietnamese government headed by President Ngo Dinh Diem.
1963	(Nov. 1) South Vietnamese generals overthrew the Diem government, and Diem was killed the next day.
1964	(Aug. 7) In the United States, the Tonkin Gulf Resolution gave the president power to take "all necessary measures" and "to prevent further aggression."
1965	(March 6) U.S. President Lyndon B. Johnson sent U.S. Marines to Da Nang, South Vietnam. The Marines were the first U.S. ground troops in the war.
1968	(Jan. 30) North Vietnam and the Viet Cong launched a major campaign against South Vietnamese cities.
1969	(June 8) U.S. President Richard Nixon announced that U.S. troops would begin to withdraw from Vietnam.
1973	(Jan. 27) The United States, North and South Vietnam, and the Viet Cong signed a cease-fire agreement.
1973	(March 29) The last U.S. ground troops left Vietnam.
1975	(April 30) South Vietnam surrendered.

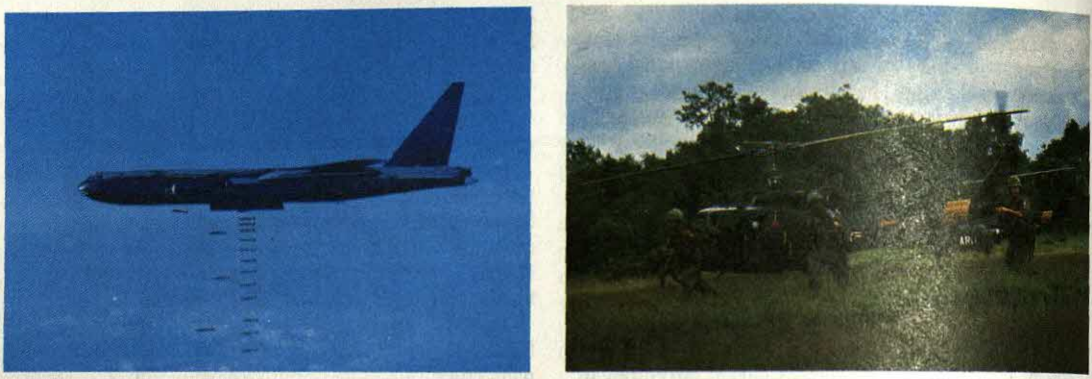
France fought against Ho's *Vietminh,* or Revolutionary League for the Independence of Vietnam, but was defeated in 1954. Peace agreements were signed at Geneva, Switzerland, in 1954. These *Geneva Accords* provided for the temporary division of Vietnam, but called for nationwide elections in 1956 to reunify the country.

Ho Chi Minh set up a Communist government in North Vietnam. The south became the Republic of Vietnam, commonly called South Vietnam. Ngo Dinh Diem, an anti-Communist, became president of South Vietnam. His government refused to take part in nationwide elections proposed by the Geneva peace agreements.

Early stages of the war. Diem was an unpopular ruler. Members of the Vietminh in the south rebelled. They were known as the *Viet Cong,* meaning *Vietnamese Communists.* North Vietnam supported the rebels. It developed a supply route to South Vietnam through



The Vietnam War was fought mainly in North and South Vietnam from 1957 to 1975. Troops also battled in Laos and Cambodia, and U.S. pilots flew missions from bases in Thailand.



The Vietnam War was fought in the air and on the ground. American B-52 bombers made thousands of raids on enemy bases in North and South Vietnam, and armed helicopters carried troops into battle. Millions of civilians became refugees.

Laos and Cambodia. This system of roads and trails became known as the Ho Chi Minh Trail.

By 1961, the Viet Cong were strong enough to threaten Diem's government. U.S. President John F. Kennedy increased American economic and military aid to South Vietnam. By 1963, there were over 16,000 U.S. military advisers in South Vietnam.

In 1963, after widespread Buddhist protests against the government, President Diem was murdered. See **Ngo Dinh Diem.** By 1964, North Vietnamese army units were operating in the south, and the Viet Cong controlled up to 75 per cent of South Vietnam's population.

In August 1964, U.S. President Lyndon B. Johnson announced that two U.S. destroyers had been attacked in the Gulf of Tonkin, off the coast of North Vietnam. Some Americans doubted that the attack had occurred, and the attack has never been confirmed. But Johnson ordered U.S. air strikes against North Vietnam. In March 1965, the first U.S. Marines were sent to South Vietnam.

The fighting intensifies. U.S. forces in Vietnam rose from about 60,000 in mid-1965 to a peak of over 543,000 in 1969. They joined about 800,000 South Vietnamese troops, and a total of 69,000 men from Australia, New Zealand, the Philippines, South Korea, and Thailand. Australian troops were first sent to Vietnam in 1965, with conscripts serving from 1966. The force was withdrawn in 1971. New Zealand soldiers served between 1964 and 1972.

The U.S. and its allies did not try to invade North Vietnam. They relied on bombing North Vietnam and on "search and destroy" ground missions in South Vietnam. Helicopters played a key role in the fighting.

The Viet Cong and North Vietnamese adopted a defensive strategy. The lightly armed Communist forces relied on surprise and mobility. Avoiding major battles, they preferred guerrilla warfare (see **Guerrilla warfare**). They knew the terrain well, and received war materials from the Soviet Union and China.

The war dragged on, with neither side able to win it. In the United States, people were divided over U.S. involvement. Some urged more decisive measures to defeat North Vietnam. Others believed the United States was supporting corrupt and unpopular governments in South Vietnam, and called for U.S. withdrawal.

In January 1968, the Communists attacked major cities in South Vietnam. This campaign began at the start of Tet, the Vietnamese New Year celebration. The United States and South Vietnam fought back, and inflicted heavy losses on the enemy. But it was clear that the Communists were far from defeated. Peace talks began in Paris in May 1968.

U.S. troop withdrawal begins. The peace talks failed, but the new U.S. president, Richard Nixon, announced a new policy known as *Vietnamization.* Beginning in July 1969, U.S. troops would gradually withdraw, leaving the fighting to the South Vietnamese.

In April 1970, U.S. and South Vietnamese troops invaded Cambodia to attack Communist military bases. This widening of the war aroused much protest in the United States. The Cambodian campaign ended in late June 1970. Opposition to the war in the United States grew rapidly, as television coverage brought scenes of war horror into millions of American homes. The antiwar movement in the United States was further outraged in 1971 when a U.S. Army officer was convicted of massacring civilians in the hamlet of My Lai in South Vietnam in 1968. Charges that U.S. forces had used chemical weedkillers to defoliate large areas of Vietnamese jungle caused widespread international protest.

In March 1972, North Vietnam invaded the South. President Nixon ordered the renewal of U.S. bombing of the North, and also the laying of explosives in the harbour of Haiphong, North Vietnam's chief port. The invasion was checked, and peace talks were restarted.

Victory for North Vietnam. The Paris peace talks were conducted by Henry Kissinger for the United States and Le Duc Tho for North Vietnam. On Jan. 27, 1973, a cease-fire agreement was signed. By April, the last U.S. troops had left Vietnam, but the peace talks broke down and fighting resumed. South Vietnam's forces were forced into retreat, and on April 30, 1975, South Vietnam surrendered. Saigon, the South's capital, was renamed Ho Chi Minh City.

Results of the war. About 1 million South Vietnamese and 58,000 Americans died in the war. Also, 501 Australian and 37 New Zealand soldiers died in the war. North Vietnamese losses ranged between 500,000 and 1 million. Countless numbers of civilians were killed.

The U.S. bombing was four times greater than the Allied bombing of Germany in World War II. Though

South Vietnam, where most of the fighting took place, suffered the most damage. The war made refugees of some 10 million South Vietnamese, about half the population.

North Vietnam suffered severe damage to its industries and transportation system, South Vietnam suffered even more damage. About half the South's population became refugees. Cropland, forest, and wildlife were destroyed in some areas.

The war made North Vietnam a power in Southeast Asia. North Vietnam helped set up Communist governments in Laos and Cambodia in 1975. In 1976, it united North and South Vietnam into the single nation of Vietnam. Vietnam has slowly rebuilt its economy, and reopened some links with the West.

The Vietnam War had far-reaching effects on the United States. It was the first foreign war in which the U.S. failed to achieve its goals. Today, Americans still disagree on the main issues of the war, and whether or not their country should have become involved.

See also **Cambodia** (History); **Johnson, Lyndon B.; Kissinger, Henry A.; Laos** (History); **Nguyen Van Thieu; Nixon, Richard; Vietnam.**

Vigée-Lebrun, Elisabeth (1755-1842), was a popular French portrait painter. She was the court painter and a personal friend of Queen Marie Antoinette.

Vigée-Lebrun painted more than 800 pictures during her long career, many of them portraits of important members of French society. She painted in a graceful and decorative style, using rich colours. Following the custom of her day, Vigée-Lebrun painted portraits that flattered her subjects.

Vigée-Lebrun was born in Paris. She first studied with her father, Louis Vigée, a painter and art teacher. She also knew and received advice from the famous artist Jean Baptiste Greuze. By the time she was in her late teens, she was a professional portrait painter. In 1776, she married Jean Baptiste Lebrun, the most important art dealer of the time.

At the outbreak of the French Revolution in 1789, Vigée-Lebrun was forced to flee from France. For the next 12 years she made a fortune by painting portraits of nobility and royalty in Italy, Austria, Germany, and Russia. Vigée-Lebrun returned to France in the early 1800's.

Vigilante is a member of a self-appointed citizen group or vigilance committee. *Vigilante* comes from the Latin verb *vigilare,* which means *to watch.*

During pioneer days of United States history, the authorities often found themselves unable to enforce the laws. Sometimes the only law officer for many miles around was the United States marshal, making it impossible to police all the territory. In these situations, the citizens frequently formed vigilance committees which dealt out swift punishment to people they considered to be offenders. Sometimes innocent people were punished. But often the vigilantes were the only force to preserve order.

Vigny, Alfred de (1797-1863), a French author, was a leading figure in the romantic movement. He is best known for his lyrical and descriptive poetry. From his *Antique and Modern Poems* (1826) to *Les Destinées* (1864), Vigny's themes include the solitude of individuals of genius, the alienation of God from humanity, the search for greatness through suffering and resignation, and the nobility of thought as expressed in philosophical poetry. His other works include the play *Chatterton* (1835), the novel *Cinq-Mars* (1826), and a collection of tales, *Military Servitude and Grandeur* (1835).

Vigny was born in Loches, near Tours. He spent much of his life living in isolation on his estate. An unhappy love affair with an actress and his failure to win political office intensified his sense of loneliness.

Vigoro is an Australian game for women played with a paddlelike bat and a ball, with stumps at each end of a pitch 17.7 metres long. It has elements of both cricket and baseball. If the ball is hit outside the batting crease, the batter must run. There are 12 players in a team. Two members of the team are bowlers, who bowl alternately. Vigoro differs from cricket in that there are no *overs.* (An over consists of a fixed number of balls delivered from one end of the pitch.) One bowler uses a white ball. The other uses a red ball. Field placings are similar but not identical to those in cricket. Neither bowler is allowed to field a ball from the other bowler.

Competitions are played in summer and winter. The game is popular in New South Wales, Queensland, and Tasmania but less popular in other states. The game is controlled by the Vigoro Association. Interstate competitions are held each year for the Dodge Cup, named after the first president of the association. Vigoro was introduced into Australia about 1919 by an Englishman, J. J. Grant, who invented the game.

Vijayanagar Empire was one of the last great kingdoms of India's medieval period. The empire was born out of the political turmoil that followed Turkish and Afghan invasions in the early 1300's. It lasted for more than 300 years and controlled much of the south of the subcontinent's peninsula. After a long period of decline, it effectively ended in the 1640's.

Two brothers, Harihara and Bukka, founded the Vijayanagar kingdom. They were officials of the kingdom of Kampili, which fell to the armies of the sultan of Delhi in 1327. The brothers were taken to Delhi, converted to Islam, and then sent back to govern Kampili for their new masters. But the brothers proclaimed their independence from Delhi, and reverted to Hinduism. In 1336, they set up a new capital, Vijayanagar (City of Victory), under Harihara.

In 1343, Bukka conquered and annexed the neighbouring kingdom of the Hoysala Ballala. This gave Vijayanagar control of the peninsula from coast to coast. But in 1347, the Bahmani sultanate established itself on Harihara's northern border and posed an enduring threat.

Bukka succeeded his brother in 1356, and became Bukka I. He attempted to deal with the threat from the Bahmani sultanate. In costly wars, he succeeded only in stabilizing the boundary between the two states at the Krishna River. But he did absorb a newly established sultanate, Ma'bar (Madura), in 1370.

Harihara II, who reigned from 1377 to 1404, attempted to reinforce central authority by removing his cousins, who were provincial governors, and replacing them with his sons. The assassination of the Sultan of Bahmani in 1378 gave Harihara the chance to capture Goa and other west coast ports. A Bahmani counterattack in 1388 and 1389 led to a siege of Vijayanagar and the slaughter of many of its citizens. Harihara fended off further damage by making alliances with the sultans of Malawa and Gujarat.

After Harihara II's death in 1404, his three sons fought each other for the throne. The survivor, Devaraya, became king in 1406. He also confronted the Bahmanis. This led to another siege of the capital and the loss of part of the disputed kingdom of Kondavidu in 1420. Devaraya realized that his rivals had a superior army and decided to reform his own forces by recruiting Turkish archers and importing fine horses from the Middle East.

Devaraya's two sons, Ramchandra and Vijaya, reigned briefly but disastrously. As a result of their wars, they lost much territory and were forced to pay enormous compensation.

Devaraya II restored much of what had been lost and welcomed Muslims into his army. He extended his territory in the south and gathered tribute from Ceylon (Sri Lanka). But decline again set in under Mallikarjuna, who reigned from 1446 to 1465, and Virupaksha, who came to the throne in 1465. The kingdom suffered greatly from invasions by Orissa and the Bahmanis during this period.

In 1485, a provincial governor called Narasimha set up a semi-independent realm of his own and began to restore some of Vijayanagar's losses. He pushed back Orissa, and when Virupaksha was murdered by his own son, Narasimha established Vijayanagar's second dynasty. Narasimha's chief minister, Narasa, was the real ruler from 1490 to 1503. Narasa completed the restoration of central power. In 1503, he placed his own son on the throne as Vira Narasimha, and so established the kingdom's third dynasty.

Vira's brother Krishna Deva Raya, who reigned from 1509 to 1529, was the most successful of Vijayanagar's rulers. He intervened forcefully and successfully in the squabbles of his neighbours. He made a skilful alliance with the Portuguese, which brought him military and commercial benefit. Krishna Deva Raya was also a lavish and informed patron of learning and the arts.

Achyuta Deva Raya, who came to the throne in 1529, faced threats from both outside and inside his kingdom. Throughout his reign he struggled to hold his realm together. He was also forced to share power with Rama Raya, his rebellious chief minister. In 1542, Rama Raya placed his nephew, Sadasiva, on the throne as a puppet king. Rama Raya intervened so much in the quarrels of neighbouring states that eventually he provoked the formation of a grand alliance against him. The alliance crushed the armies of Vijayanagar at the Battle of Talikota in 1565, sacked the capital, and killed Rama Raya.

Virupaksha Temple dominates Hampi, site of Vijayanagar. The *gopuram* (gateway tower) is over 50 metres high.

Rama Raya's brother, Tirumala, fled southward with King Sadasiva and set up a base at Penugonda. There he rebuilt his army but was forced to accept the independence of southern provinces. In 1570, ignoring Sadasiva, Tirumala had himself crowned, thus founding the kingdom's fourth and final dynasty. He then retired in favour of his son, Sriranga, who reigned from 1572 to 1585.

Sriranga struggled to beat off destructive invasions from Golconda, and to prevent the state from breaking up even more. His vigorous brother, Venkata, who ascended the throne in 1585, managed to stop the decline but could not reverse it. The next ruler, Sriranga II, was murdered after reigning for only four months. This event sparked off a long civil war. When Rama Deva Raya came to the throne his authority was little greater than that of his provincial governors. In 1642, an expedition from Golconda drove him from his capital at Vellore. His nephew, Sriranga, had himself crowned, but could not assert his authority and retired to Mysore. The empire effectively ended in the 1640's, but Sriranga kept a court in exile until his death in 1672.

The Vijayanagar realm successfully united a region of many different languages and established, and benefited from, vigorous international trade. At its peak, it also sponsored brilliant achievements in literature and the arts. The rulers of Vijayanagar were Hindus, and occasionally claimed to be strict defenders of the faith. But they were quite prepared to ally themselves with Muslims, and employed Muslim servants when it suited them. The great and persistent weakness of the realm lay in its inability to prevent local governors from claiming independent authority and power. This was especially so when pretenders to the throne squabbled over who was to be king and thus provided opportunities for rebellion.

Today, Vijayanagar (Hampi) is a deserted ruin which provides a magnet for tourists and archaeologists. In its greatest days, the capital covered an area of 33 square kilometres. It was ringed by seven concentric lines of defence and had a population of up to half a million.

See also **India, History of.**

Vikings were seafaring peoples who rose to dominance in northern Europe during medieval times. History has tended to portray them as fierce pirates and warriors who terrorized Europe from the late 700's to about 1100. But during this period, daring Viking sailors also explored the North Atlantic Ocean and even reached America. These acts of piracy and exploration have given this period of European history the name *the Viking Age.* Yet the Vikings were also gifted artists, storytellers, and poets.

The Vikings lived in Scandinavia, a region of Europe that includes what are now Denmark, Norway, and Sweden. The Vikings conquered or looted parts of England, France, Germany, Ireland, Italy, Russia, and Spain. At first, they raided these areas to obtain loot. Later, they set up trading centres and trade routes. Viking ships carried settlers to Greenland, which was unknown to Europeans at that time, and to Iceland. Leif Ericson, a Viking explorer, landed in North America about 500 years before Christopher Columbus arrived there in 1492. The Vikings established a settlement in North America, but it lasted only a few years.

The name *Viking* came from *Vik,* the Norwegian word for inlet. Vikings dwelt in the numerous inlets along the Norwegian coast. Among the Scandinavians, the expression *to go a-viking* meant *to fight as a pirate or warrior.* Other Europeans called the Scandinavians *Norsemen, Northmen,* or *Danes.* Swedish Vikings settled in eastern Europe, including part of what became Russia. Some historians believe that the Swedish Vikings became known there as the *Rus,* and that Russia was named after them.

Few Scandinavians of the Viking Age spent all their time going a-viking. The majority worked most of the time as farmers or in other peaceful occupations. Today, however, most historians use the term *Vikings* for all Scandinavians of this period.

The Viking Age began after a long period of rapid population growth in Scandinavia. This growth reduced the amount of available farmland. It led many Vikings to leave Scandinavia to find a source of wealth or a new place to live. At the same time, Scandinavians developed new shipbuilding techniques that enabled their ships to travel farther than ever before.

The Vikings had no direct effect on the history of America. But their conquests in Europe influenced relations between England and France for hundreds of years after the Viking Age.

Viking life

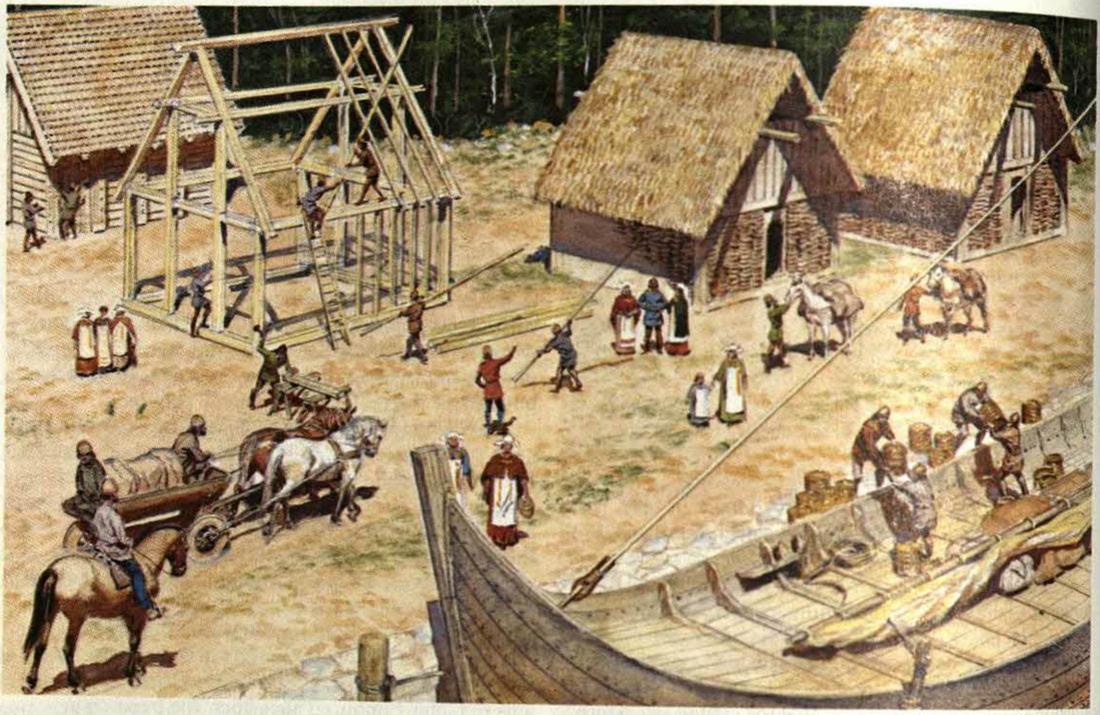
Ancestry and population. The ancestors of the Vikings were Germanic peoples who once lived in northwestern Europe. From about 2000 B.C., they moved to what are now Denmark, Norway, and Sweden. A separate group of Vikings developed in each of these areas, but they all shared the same general culture.

The Vikings spoke a Germanic language that had two major dialects. All the Vikings understood both dialects. The Vikings used an alphabet made up of characters called *runes.* Each rune consisted chiefly of straight lines arranged singly or in combinations of two or more. See **Rune; Kensington rune stone.**

The Vikings lived in small communities or villages. A king or chief ruled each Viking community. The people were divided into three social classes—nobles, freemen, and slaves. The nobles included the kings, chiefs, and other people who had great wealth or were descendants of highly honoured ancestors. The freemen included farmers, merchants, and others who served the ruler or worked for themselves. Many of the slaves were Scandinavians whose ancestors had been enslaved. Others were Europeans captured in raids and battles. The majority of Vikings stayed in one class for life.

Each Viking community had a governing council called a *Thing* or *Folkmoot.* This council, made up of the community's nobles and freemen, made laws, decided whether the community would go to war, and held trials to judge criminals. Its decisions were more important than rulings of the king or chief. In effect, this council was an early form of modern parliament.

Fierce Viking warriors terrorized many seaside and riverside towns in Europe. Their swift, light warships sailed well in either rough seas or shallow rivers and could be easily dragged ashore. These ships made possible the Vikings' surprise attacks and quick retreats.



A typical Viking settlement consisted of a small farming community built near a river or *fiord* (inlet to the sea). Most Viking houses had walls made of stone or wood. Many houses were one-room structures as shown above. Others were long buildings with three or more rooms.

Economic activities. The great majority of Vikings were farmers. They grew barley, oats, rye, and a variety of fruit and vegetables. They also raised cattle, goats, pigs, and sheep. Other Vikings worked in fishing, metalworking, shipbuilding, and woodcarving. In the largest communities, many people made their living as merchants. Those interested mainly in trade sailed to most parts of the known world and traded farm products, furs, various other goods, and slaves for such products as gold, silk, silver, and weapons.

Family life. Parents arranged most Viking marriages. The husband ruled the Viking family, but Viking women had more rights than did the women of other European societies of that time. For example, any Viking woman could own land or other property, and a wife had a right to share in the wealth that her husband gained. Viking law permitted a married woman to get a divorce whenever she wished.

Viking men were allowed to have two or more wives at the same time. This custom was most common among

Viking artifacts

Woodcarving of a horse's head, *above,* decorated part of a Viking tent. This carving was done in the 800's.

This picture stone was carved on a monument in the 700's. It shows a warrior on horseback and magic symbols.

The sword was a prized weapon among the Vikings. A sword maker of the 1000's fashioned this handle out of silver.

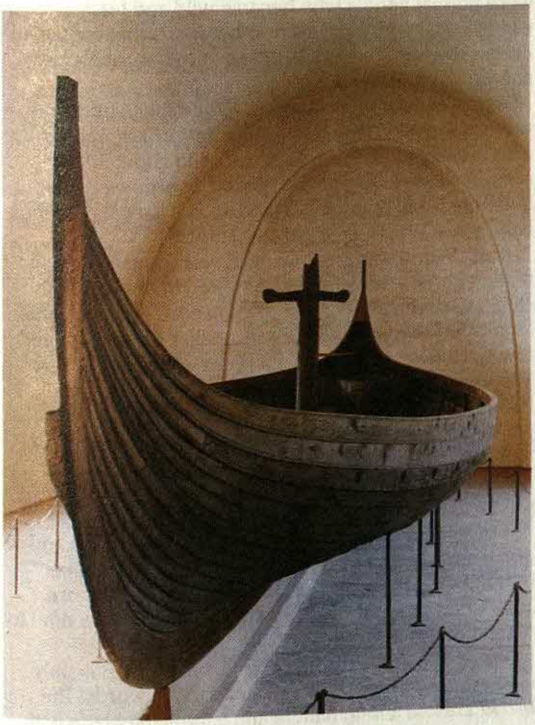
wealthy Vikings, who could afford to support more than one wife. Many nobles had three or more wives and large families. Such families helped produce the population boom that became one of the chief causes of the Viking movement out of Scandinavia. The members of a Viking family developed strong ties to one another. Conflicts between individuals of different families often turned into feuds between the families. Such feuds were violent and bloody.

The Vikings became known for burial customs that involved great ceremony. Many rich Viking men and women were laid to rest in a ship that was then buried. The Vikings believed that such *ship graves* provided a safe, comfortable journey to the land of the dead. Many of the dead person's possessions, including beds, jewellery, and weapons, were placed in the ship. In some cases, the person's dogs and even slaves were buried alive in a ship grave.

Food. The Vikings ate two meals daily, one in the morning and the other in the evening. They used spoons and knives, but had no forks. Most of the food, including beef, cheese, eggs, and milk, came from their farms.

The Vikings also hunted and fished for food. Hunters supplied meat from deer, elks, polar bears, seals, and whales. The fish catch included cod, herring, salmon, and trout.

Clothing. Most Viking men wore two basic garments —trousers that reached to the knee or ankle, and a long-sleeved pullover shirt that reached below the waist. Viking women wore loose-fitting dresses that were made of linen or wool and hung almost to the ankles. All the Vikings wore leather shoes.



This Viking ship was found buried in a ship grave in Norway. It is about 25 metres long and was built mostly of oak.

Housing. Most Viking houses were one-storey structures with slanted roofs. Some houses had only one room. Others had three or more. Builders made the walls mainly out of wood or stone, and covered the roof with shingles, turf, or straw. Each home included a hearth that provided heat and light as well as a place to cook. Viking houses had no windows. The husband used a chair called the *high seat.* The rest of the family sat on benches, which also served as beds.

Religion played an important role in Viking life. The Vikings worshipped a number of gods. The most important ones were Odin, Thor, and Frey.

Odin, also known as Woden, was king of all the Norse gods and goddesses. He was the god of battle and death. Odin lived in a home of the gods that was known as *Asgard.* The Vikings believed that if they died fighting, they would go to a hall in Asgard called *Valhalla.* There, they could fight all day and dine all night. *Wednesday* was named in honour of Odin. See **Odin.**

Thor, ruler of the sky, was the god of lightning, thunder, rain, storms, and winds. He was the most popular Viking god because his power over the weather had a great effect on the lives of the people. The Vikings prayed to Thor for good harvests and good fortune. *Thursday* was named after Thor. See **Thor.**

Frey was the god of agriculture and love. Frey and Thor together ensured the success of a harvest and blessed a marriage. See **Frey.**

Contact between the Vikings and European Christians led to the end of the Norse religion. English and German missionaries helped make Christianity the chief religion in Scandinavia by the early 1100's.

Cultural life and recreation. Poetry was the most popular form of literature among the Vikings. The poets' favourite subjects included the gods and Viking battles. Court poets called *skalds* entertained Viking kings and their guests. Most kings took their skalds into battle so that the poets could recite verses believed to bring good luck and victory.

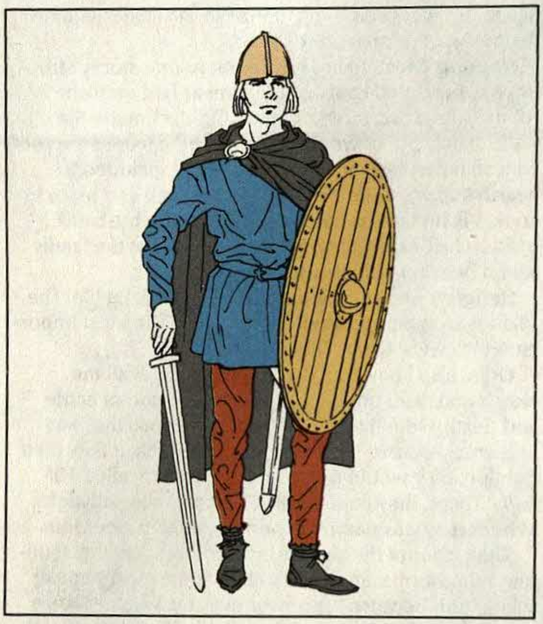
Many Viking artists used a style in which animals were portrayed with twisted bodies. A favourite subject was the *gripping beast,* which was pictured wildly gripping its throat, sides, or other parts of its body. Swedish artists often carved the gripping beast and other animal figures on limestone rocks called *picture stones.*

The Scandinavians worked skilfully at many crafts, especially metalworking and woodcarving. They produced attractive bracelets, brooches, necklaces, and other kinds of jewellery, much of it from silver. Viking woodcarvers decorated homes, ships, and wagons with elegant, detailed carvings of beasts and warriors.

For recreation, the Vikings especially liked rowing, skiing, swimming, and wrestling, and they enjoyed watching horse races. They also played chess and other board games.

Shipbuilding and navigation

The sea almost surrounded the Vikings' Scandinavian homelands. In addition, hundreds of *fiords* (inlets to the sea) cut into the coastline. As a result, water travel was the main form of transportation in the region, and the Vikings became a seafaring people.



A Viking warrior fought with a sword that had a broad two-edged blade made of iron or steel. For protection, he carried a round wooden shield and wore a leather helmet.

The Vikings as shipbuilders. The Vikings ranked among the best shipbuilders of their time. They built their ships out of wood that they cut from the vast Scandinavian forests. Viking shipbuilders greatly improved the sailing ability of Scandinavian ships by adding a *keel,* a long, narrow piece of wood attached to the underside of a ship. It extended down into the water along the centre of the entire length of the ship. The keel reduced a ship's rolling motion. By doing so, it greatly improved the ship's speed and thus the distance it could travel without stopping for supplies. The keel also made it easier to steer the ship.

Viking ships came in different sizes, depending on whether the ship was used for trade or for battle. Trading ships, called *knorrs,* were about 15 metres long. Warships, also known as *long ships,* ranged in length from about 20 to 30 metres and were about 5 metres wide.

A Viking warship sailed well in either rough seas or calm waters. It was light enough to enter shallow rivers. At sea, the Vikings depended mainly on the wind and the ship's large woollen sail for power. On a river, rowers powered the ship. A warship had from 15 to over 30 pairs of oars. The *prow* (front end) of a Viking warship curved gracefully upward and ended with a woodcarving of the head of a dragon or snake. See **Ship** (Viking ships; pictures).

The Vikings as navigators. Early Viking navigators depended primarily on sightings of the sun and the stars to determine direction and approximate location at sea. By the late 900's, however, the Vikings had developed a system that enabled them to determine the latitude in which they were sailing. They made a table of figures that showed the sun's midday height for each week of the year. By using a measuring stick and this table, a navigator could make a sighting and estimate the latitude of the ship's location.

Viking navigators also relied on landmarks. The Vikings sailed from Norway to Greenland using sightings of the Shetland and Faeroe islands and Iceland as landmarks.

Sometimes, Viking sailors found their directions with the help of ravens, which were known for their ability to find land. If the sailors were unsure about the direction of land, they would release a raven from the ship and then sail in the same direction that the bird flew. The raven became a favourite symbol of the Vikings and was shown on their flag.

The Viking flag showed a raven, a favourite symbol of Viking sailors.

Warfare

Viking warriors enjoyed fighting. They were bold and adventurous, but they were also brutal and fearsome. They murdered women and children as well as men. What they did not steal, they burned. The Vikings created such terror in the hearts of other Europeans that a special prayer for protection was offered in the churches: "God, deliver us from the fury of the Northmen."

The cruellest and most feared Viking warrior was called a *berserker* or *berserk.* Some historians believe berserkers were raging madmen. Others think they were normal people who became wild and fearless after eating certain mushrooms or other foods that contained drugs. The term *berserk* is still used to describe a person who acts wildly.

Battle strategy and tactics. When the Vikings invaded a territory, they launched a fleet of several hundred warships, each probably carrying about 30 warriors. Thousands of fighters landed, overpowered the defenders, and overran the land. In this way, the Vikings conquered land in England and France.

Most Viking warfare, however, was waged by small raiding parties. Such forces consisted of from 2 to 10 ships, also with about 30 raiders on each ship. The chief targets of Viking raids included small, poorly defended towns, isolated farms, and churches and monasteries. The Vikings launched raids mainly to get cattle and horses, food, and valuable objects made of gold or silver. Churches and monasteries were especially prized for such richly ornamented articles as beautiful ivory *croziers* (ornamental staffs) and books covered with gold and precious stones.

The Vikings became known for surprise attacks and quick retreats. They could row their light, swift ships into shallow rivers and then easily drag them ashore. They often struck so fast that their victims had no time to defend themselves.

Weapons and armour. The Vikings fought mainly with axes, bows and arrows, spears, and swords. The *broad axe* had a long handle and a large flat blade with a curved cutting edge. The Viking warrior used two hands to swing the broad axe at an opponent. The Viking sword had a broad two-edged blade that was made of iron or steel. The fighter swung the sword with a chopping or hacking motion, aiming at an opponent's arms or legs.

Most Viking warriors carried round wooden shields for protection. Many raiders also wore a sort of armour made from thick layers of animal hides, perhaps with bone sewn into them for added protection. Only Viking leaders wore helmets and coats of *mail* (metal armour). Most of the helmets were made of leather and somewhat cone-shaped. Artists have often pictured Viking warriors wearing helmets with cattle horns on the sides, but the Vikings never had such helmets.

Exploration and conquest

Scholars link the start of the Viking rampage with several conditions in Scandinavia at the time. Perhaps the most important was a rapidly growing population, which led to overcrowding and a shortage of farmland. In addition, family feuds and local wars made life in Scandinavia difficult for many Vikings. Many other Vikings, especially those who were young, poor, or without land of their own, saw in raiding and conquering a means to obtain wealth and honour.

The Norwegian Vikings began the Viking reign of terror. In June 793, Norwegian raiders attacked and looted the monastery of Lindisfarne, on an island off the east coast of England. A wave of Norwegian raids against England, Ireland, the Isle of Man, and Scotland followed. Ireland's many fertile farms and rich churches and monasteries made it an especially attractive target. Turgeis, a Norwegian pirate chief, terrorized Ireland from 839 to 845. He founded the town of Dublin and used it as his headquarters.

During the mid-800's, Norwegian raiders struck targets farther from their homeland. They looted and burned towns in France, Italy, and Spain. In the late 800's, many of the Norwegians turned their attention from Europe to the North Atlantic. Norwegian settlers began to migrate to Iceland about 870. About 25,000 Vikings had settled in Iceland by the mid-900's.

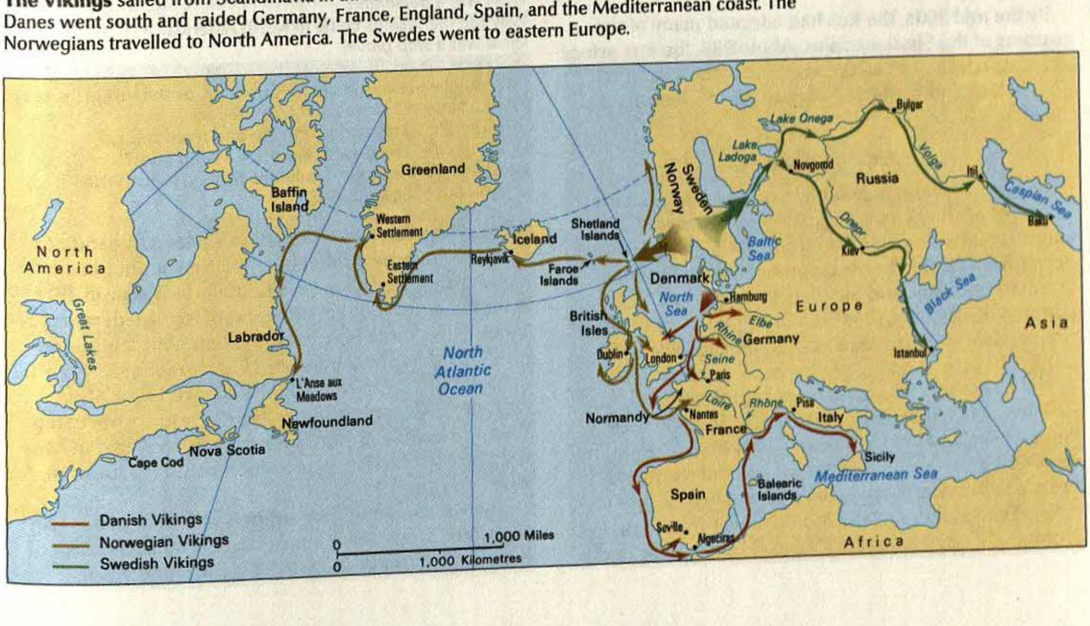
About 982, Eric the Red, a Norwegian who had been living in Iceland, sailed with his family to Greenland. About 985, he persuaded several hundred Icelanders to settle in Greenland (see **Eric the Red**). Soon afterward, Bjarni Herjulfsson, a Viking sea captain, became the first known European to see the mainland of North America. He made the sighting after sailing off course during a voyage from Iceland to Greenland. After Herjulfsson reached Greenland, he told the settlers there about the territory he had passed. Having just arrived in Greenland, the settlers were not interested in exploring other lands at that time.

About 10 years later, after all the good cropland in Greenland had been taken, interest began to grow in the land Herjulfsson had sighted. About 1000, Leif Ericson, a son of Eric the Red, led an expedition westward from Greenland to find the new territory. He and his crew landed somewhere on the east coast of North America and spent the winter there. The Vikings made wine from the plentiful supply of grapes they found, and Ericson called the area *Vinland,* or *Wineland.* See **Ericson, Leif; Vinland.**

The Vikings soon established a colony in Vinland. In time, however, they were driven away by Indians and did not return. Some historians believe that Vinland was located in what is now Maine or Massachusetts. Others think Vinland was in the present-day Canadian province of Newfoundland.

The main evidence of the Vikings' presence on the mainland of North America comes from remains of a Viking settlement, which were found at L'Anse aux Meadows, near St. Lunaire, Newfoundland, in 1961. According to the *sagas* (stories of heroic deeds) written by Icelanders long after Viking times, a number of settlements were established in Vinland over a period of about 20 years. However, no maps or other records of the colony have survived.

The Vikings sailed from Scandinavia in three main directions from the A.D. 700's to the 1000's. The Danes went south and raided Germany, France, England, Spain, and the Mediterranean coast. The Norwegians travelled to North America. The Swedes went to eastern Europe.



The Danish Vikings began their raids in the early 800's. They looted and burned towns on the coasts of what are now Belgium, France, and the Netherlands. In 865, the Danes invaded England. They conquered all the English kingdoms except Wessex and settled in the eastern half of the country. In 886, Alfred the Great, king of Wessex, forced the Vikings to withdraw to the eastern third of England (see **Alfred the Great**). This area became known as the *Danelaw.*

During the late 800's, Danish Vikings began to attack French towns again. In 886, King Charles II of France paid the Vikings a huge treasure to end their yearlong siege of Paris. In 911, King Charles III of France and a Danish Viking chieftain named Rollo agreed to the treaty of St. Clair-sur-Epte. According to the treaty, Rollo accepted Christianity and pledged to support the French king. In turn, Charles granted the Vikings control of the area in France now known as *Normandy* (Land of the Northmen). See **Normans.**

During the late 900's, the Danish Vikings renewed their interest in England. Ethelred II had become king of England about 978, when he was only about 10 years old. The English nobility refused to support Ethelred, and so England's defence against invasion was much weakened. In 994, Danes led by Sweyn Forkbeard, a son of King Harald Bluetooth of Denmark, went to war against England. In 1016, Sweyn's son Canute finally brought England under Danish control. The Danes ruled England until 1042.

The Swedish Vikings began to raid towns along rivers in eastern Europe during the early 800's. They set up a number of trade centres in this region, which included what later became western Russia. The people of that area were mostly Slavs. The Slavs called the Swedish Vikings the *Rus.*

The Swedes gained control of the key trade routes between the Baltic Sea and the Black Sea. They built forts along these routes to protect traders from frequent attacks by wandering raiders. By the late 800's, the Russian towns of Novgorod and Kiev had become Swedish strongholds. In time, Kiev became the first state of Russia.

By the mid-900's, the Rus had adopted many of the customs of the Slavic peoples. About 988, the Rus prince Vladimir I destroyed all the symbols of the Viking religion in Kiev and made Christianity the official religion of the Rus.

Viking influence

The most important influence of the Viking period was its effect on Scandinavia, the homeland of the Vikings. The creation of three strong Viking kingdoms in Scandinavia led to the development of three nations—Denmark, Norway, and Sweden. When the Vikings adopted Christianity, they then brought the countries of Scandinavia into the mainstream of European civilization.

The Norsemen also had an enormous influence on developments in England and France. The Viking invasions of England in the 800's and 900's helped unify and strengthen England. The establishment of Normandy in France in 911 was the source of years of conflict between France and England. William the Conqueror, a Norman descendant of the Viking chieftain Rollo, led a Norman army to victory over the English and became king of England in 1066. England and France later fought for control of Normandy during the Hundred Years' War (1337-1453). See **William** (William I, the Conqueror); **Hundred Years' War.**

The Vikings had a lasting effect on Iceland, where they established a permanent settlement that reflects some elements of Viking culture to this day. Although the Vikings established Vinland in North America, they did not influence later European exploration of the New World. Vinland remained unknown to the rest of Europe until long after Columbus had gained credit as the European discoverer of America.

Related articles in ***World Book*** include:

Denmark (Early days)
England (The Anglo-Saxon period)
Eric the Red
Ericson, Leif
Greenland (History)
Iceland (History)
Ireland (The Viking raiders)
Kensington rune stone
Normans
Norway (The Viking period)
Rune
Sweden (The Swedish Vikings; picture: Picture stones)
Russia (Early days)
Vinland
Warship (picture)

Outline

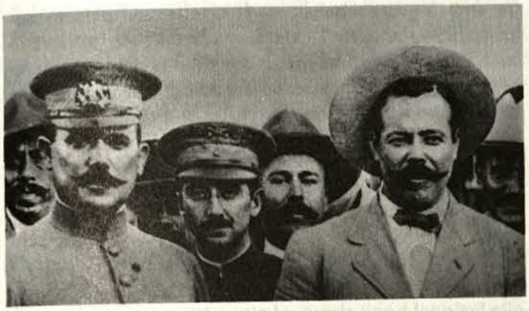
I. Viking life
  A. Ancestry and population
  B. Economic activities
  C. Family life
  D. Religion
  E. Cultural life and recreation
II. Shipbuilding and navigation
  A. The Vikings as shipbuilders
  B. The Vikings as navigators
III. Warfare
  A. Battle strategy and tactics
  B. Weapons and armour
IV. Exploration and conquest
  A. The Norwegian Vikings
  B. The Danish Vikings
  C. The Swedish Vikings
V. Viking influence

Questions

Why were Viking ships well suited to surprise raids?
What were the three classes of Viking society?
What was a *berserker*?
Why did the Vikings come to North America?
What was a *ship grave*?
What was the occupation of most Vikings?
How did the establishment of Normandy by the Vikings affect the history of France and England?
Why did the Vikings raid churches and monasteries?
Who were the three most important Viking gods?
What were some of the conditions that led to the Viking movement out of Scandinavia?

Villa, Pancho (1877-1923), was a Mexican bandit chieftain who became a rebel general. He sought to control Mexico after the fall of President Porfírio Díaz in 1911. After the murder of President Francisco Madero in 1913, Victoriano Huerta became president. Villa supported him briefly. When Venustiano Carranza moved to gain control of Mexico in 1914, Villa attacked him. Álvaro Obregón, who was a supporter of Carranza, defeated Villa and helped Carranza become acting chief of Mexico (see **Mexico** [The constitution of 1917]; **Obregón, Álvaro**).

The United States encouraged Villa at first, but President Woodrow Wilson turned to Carranza because of reports of Villa's brutalities. Villa retaliated against



Pancho Villa, *right,* and Álvaro Obregón are shown at a meeting near El Paso, Texas, U.S.A., in 1914. The two men later became enemies.

Americans in Mexico, stopping trains and shooting those on board. In 1916, his troops raided Columbus, New Mexico. They burned the town and killed 18 people. President Wilson sent U.S. soldiers into Mexico in pursuit of Villa. Hampered by orders not to use Mexican railways, U.S. troops failed to capture Villa. All Mexicans, including President Carranza, resented the U.S. expedition. The expedition was withdrawn from Mexico in 1917.

Obregón drove Carranza from power in 1920 and pacified Villa by a grant of land. Villa was ambushed and shot by enemies in 1923. He was born Doroteo Arango in Río Grande, Zacatecas, Mexico. He changed his name to Francisco Villa, and was called Pancho Villa.

Village is a small cluster of dwellings with inhabitants who feel a sense of *community*—that is, a sense of belonging to a group and sharing the economic and other resources of a place. A village is usually smaller than a town. But size is not necessarily the best means of distinguishing a village. The number of people living in a village may vary from 50 to 5,000 people.

Villages in industrial countries, such as in Europe, have a church, primary school, meeting hall, pub (public house) or inn, and a general store or shop. The buildings in such villages are often made of local stone and other materials. The inhabitants include people whose families have lived and worked there for many generations, and people who have recently moved from cities to the area.

Village-type localities exist in cities throughout the industrial world, although they are not all called villages. In the United States, a village might be a municipal unit that is smaller than a town. In New Zealand, a village locality is a self-contained city area or neighbourhood complete with its own shops.

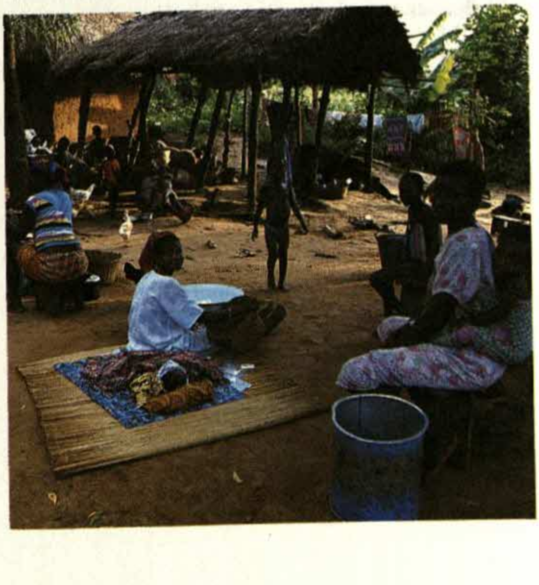
Villages in developing countries vary from one culture to another. Physically, these villages are clusters of homes, often with space for rearing a few domestic animals. Usually, there is a communal meeting house and a place of worship, such as a temple or religious mission. In many countries, villages also have a local mission school.

As social units, villages show the greatest variations. In Islamic countries, villages consist of several distinct clusters of households linked by family connections and occupying a particular area in the village. These villages are self-governing and self-contained. Even people from nearby villages are regarded as outsiders. Village life allows for a strict separation of men and women, both privately and in public.

In India, a village is presided over by a chief. Groups of villages form administrative units in the local government system known as the *Panchayati Raj. Caste* (social class) and ethnic and linguistic composition help determine the different characters of Indian villages. The topmost landowning caste forms the nucleus of the village. Landowners pay for the services of specialist caste members, such as blacksmiths, potters, and labourers. The landowning caste is obliged to provide protection for the whole village.

In Pakistan, village unity is reinforced by exchanging gifts at times of celebration, such as marriage. In Bangladesh, councils of elders from several villages meet

Contrasting village styles in Europe and Africa are seen in these dwellings in Alsace, France, *left,* and on Lake Volta, Ghana, *right.*



regularly and promote mutual cooperation among and between villages.

In South Africa, villages are populated mostly by the family *dependants* (wives, children, and elderly parents) of migrant workers who have jobs in the cities and live in hostels there. Other migrant workers may be employed in the mining and manufacturing industries. These workers go back to their home villages on rare occasions, but they send home money frequently to support their families.

The first villages appeared when small bands of farmers and sheep herders settled permanently in well-watered places where the land could be tilled. This important step in human civilization happened early in the *Neolithic* (New Stone Age) period. The earliest villages were Neolithic communities in Middle Eastern countries, such as Egypt, Iraq, Palestine, and Turkey, dating from 7000 B.C. These communities discovered how to grow wheat, barley, lentils, and peas from seed.

About 5000 B.C., people in China began to settle in well-organized villages. By 3000 B.C., villages were established in the Indus Valley and also in Central America.

The basic features of a village developed early. Even in prehistoric times, they consisted of family dwellings clustered around a communal meeting place, a temple or other religious building, and a communal food store. Human social development began in these early villages, and people laid down the basic rules for living together by which most people still live.

See also **Town**.

Villa-Lobos, Heitor (1887-1959), was a Brazilian composer who played a crucial role in developing a Brazilian national style of music. Villa-Lobos composed nine *Bachianas Brasileiras* (1930-1944) that blend Brazilian folk tunes with the style of the German composer Johann Sebastian Bach. Villa-Lobos wrote 16 *Chôros* (1920-1928), primarily for large orchestra. These works were named after Brazilian bands of street musicians whose style was based on improvisation. Villa-Lobos' large output also includes 12 symphonies and 16 string quartets, as well as ballets, operas, and oratorios. He was born in Rio de Janeiro.

Villein was an agricultural worker whose status was midway between that of freeman and slave during the Middle Ages in England. Villeins differed from slaves because villeins were not the property of a master. They differed from freemen because they were bound to a plot of land that they did not own. In return for the use of this land and protection on it, villeins were required to render certain manual and other services to the lord of the manor. The children of villeins were born into the same bondage as their parents.

Lands held in villeinage often were passed from father to son until the family acquired a right to them by *prescription* (long use). But the villein still had to serve a master. The villein's sole title to land was a copy of the entries on the court roll. For this reason, villeins came to be called *tenants by copy of court roll.* Tenure of this type was called *copyhold.* This tenure existed until it was practically abolished by the Copyhold Act of 1894. The Property Act of 1925 ended all tenure by copyhold.

Villeinage began to decline in the 1100's when the villein began to exchange labour services for money. In the end, the villein became a free tenant who paid rent for land. By the early 1500's, few villeins were left in England. The contempt in which the villeins were commonly held may be responsible for the fact that we get the word *villain* from the earlier word *villein.*

See also **Feudalism; Serf.**

Villiers, Alan (1903-1982), a distinguished Australian sailor, became Australia's most important and prolific writer about the sea. Foremost among the books based on his many voyages is *Whaling in the Frozen South* (1926), an account of his experiences in a whaling fleet in Antarctica. *Whalers in the Midnight Sun* (1934) is a juvenile fictional book about whaling. His other books include *Falmouth for Orders* (1930), *By Way of Cape Horn* (1931), *Cruise of the Conrad* (1952), and *Captain Cook* (1972).

Alan John Villiers was born in North Melbourne, Victoria. He won the Distinguished Service Cross during World War II (1939-1945).

Villiers, George. See **Buckingham, Duke of.**

Villon, François (1431- ?), was a great French poet. His principal works are *Le Petit Testament* and *Grand Testament.* Villon's fast-moving verses bring to life a vivid and colourful description of the sights, sounds, and smells of Paris.

Villon ridiculed the great and the powerful. He poked fun at lawyers, churchmen, and merchants, and laughed at the tricks, shady dealings, and bawdy jokes of swindlers, thieves, prostitutes, and rowdy students. But, besides these themes, Villon also wrote poetry of great tenderness, charm, and melancholy. He was sincerely religious and his deepest themes include brotherhood and love for humanity.

Villon was born in Paris and studied for the clergy at the University of Paris. But he became involved in murder, theft, and brawls. He was sentenced to be hanged in 1463, but his sentence was reduced to banishment from Paris. Nothing is known of his life after this date.

Vilnius (pop. 535,000) is the capital and largest city of Lithuania. It lies in southeastern Lithuania, on the Neris (Wilija) River. For location, see **Lithuania** (map).

Vilnius is an important industrial, transportation, and cultural and educational centre. Its products include chemicals, computers, food products, furniture, industrial machinery, and textiles. Railways pass through the city and an airport is nearby. The State University was founded in Vilnius in 1579.

Vilnius is best known for its many old churches and other buildings that date from between the 1400's and 1800's. The city also has many modern buildings that were erected after World War II ended in 1945.

Vilnius was founded in about 1323 by Lithuanian Grand Duke Gediminas. The city was controlled by Russia from 1795 to 1918. Lithuania became an independent nation in 1918, but Vilnius was controlled by Poland from 1920 to 1939. In 1939, the city was returned to Lithuania. In 1940, Lithuania was seized by the Soviet Union and forced to become part of that country. In 1991, Lithuania broke away from the Soviet Union and became an independent nation again.

See also **Lithuania** (picture).

Vimy Ridge, Battle of, was a World War I battle in which Canadian forces scored an important victory over the Germans. In the battle, the Canadians captured Vimy

Ridge, a strategically located hill near the town of Arras, in northern France.

The battle began on April 9, 1917. The Canadian Corps was part of the British Army, and the battle was part of the British spring offensive. The British attacked Arras while the Canadians attacked the ridge. The chief goal of this offensive was to draw German troops away from Aisne, a town to the south that the French were to attack a week later. The other goal of the offensive was to win Vimy Ridge and Arras. The Canadians took the ridge on April 14. The British offensive succeeded. But the French offensive, and the Allied offensive as a whole, failed.

Viña del Mar (pop. 307,308) is the leading seaside resort city of Chile. It lies on the Pacific coast, about 6 kilometres north of Valparaíso. Viña del Mar's mild climate, beaches, hotels, nightclubs, and race tracks make it one of the most popular holiday resorts in South America. The city has several food processing factories. Oil refineries are located near the city. Viña del Mar is one of the largest cities in Chile.

See also **Chile** (political map).

Vincent de Paul, Saint (1581-1660), a Roman Catholic leader, founded two important religious orders. In 1633, he and Saint Louise de Marillac established the Daughters of Charity (now often called the Sisters of Charity), the largest Catholic order for women worldwide. Vincent de Paul founded the Congregation of the Mission for men in 1625. Members of this order are called *Lazarists* or *Vincentians*. The early Vincentians were missionaries. They also directed seminaries and organized conferences and retreats to train young priests. Today, Vincentians staff many Catholic schools and universities.

Vincent de Paul was born in southwestern France. He was pastor and chaplain in Paris and Lyon, where he organized help for the poor. The Saint Vincent de Paul Society was founded in Paris in 1833 to carry on his work for the poor. The feast day of Saint Vincent de Paul is September 27.

Vincent of Beauvais. See **Encyclopedia** (From the 1200's to the 1600's).

Vincent's infection. See **Trench mouth.**

Vinci, Leonardo da. See **Leonardo da Vinci.**

Vine usually means a plant that has a weak and flexible stem requiring some kind of support. Some vines can climb walls, trellises, or other plants. Other vines creep along the ground. Some vines have tendrils, which wind around their support. Other vines have discs that cling to the object they are climbing.

There are two important kinds of vines—*woody vines,* also called *lianas,* and *herbaceous vines.* Grapes are woody vines. Sometimes the woody vine is fairly short and can support itself. Then it is somewhat like a shrub. Common kinds of herbaceous vines include cucumbers, garden peas, and beans.

Related articles in *World Book* include:

Bean
Betel
Bignonia
Bittersweet
Bramble
Chayote
Clematis
Cowpea
Cranberry
Gourd
Grape
Honeysuckle
Hop
Ivy
Jicama
Liana
Moonflower
Morning-glory
Pea
Pelican flower
Philodendron
Smilax
Virginia creeper
Wisteria

Vinegar is a sour liquid used for seasoning and for preserving foods. The name *vinegar* comes from a French word meaning *sour wine.* But many kinds of vinegar are made from substances other than wine. Vinegar is produced by the action of yeast and bacteria on agricultural products, including fruit, grain, and such sugar solutions as honey and molasses. The different kinds of vinegar take their names from the raw material used. For example, wine vinegar comes from grapes, cider vinegar from apples, and malt vinegar from malted barley.

Making vinegar involves several steps. First, the raw material is made liquid and its sugar content is adjusted to the level desired by the producer. Fruit are crushed. Grains are soaked in water in a process called *malting,* which releases their sugars. Water is added to honey or molasses to *dilute* (weaken) the sugar concentration.

In the second step, the sugars in the liquid are turned into alcohol. This process is called *fermentation.* The liquid undergoes fermentation in a barrel or tank that air cannot enter. Yeast added to the liquid begins the fermentation process, which lasts two or three days.

In the third step, the alcohol is converted to *acetic acid* and water in a process called *acetification.* Acetic acid gives vinegar its sour taste and its preservative quality. Bacteria of a variety called *acetobacter* in combination with air causes acetification to occur. The speed of the acetification process depends largely on the rate at which the alcohol is exposed to air. The method of acetification used today allows the alcohol rapid exposure to the air and usually requires only one or two days. The alcohol trickles through a bed of wood shavings, *corncobs* (ears of maize), or other coarse material that has been packed into a vessel called a *generator.* Air pumped up from the bottom of the generator comes into contact with the liquid as it trickles through the bed. The liquid may flow through the generator several times before all the alcohol has turned into acid. After acetification, the vinegar is filtered to remove impurities. It is then pasteurized and bottled for sale.

In the traditional method of acetification, the alcohol partly filled an open vessel such as a barrel. Only the liquid's surface came into contact with the air. Acetification took weeks or months to complete by this method.

Uses of vinegar. Vinegar is sold for use both in the home and by commercial food processors. It is used mainly as a flavouring agent, especially in salad dressings and sauces and on vegetables and meats. Vinegar is also used to preserve fruit, vegetables, and other foods in a process called *pickling* (see **Pickle**).

Kinds of vinegar. Vinegar sold for use at home typically contains 5 per cent acetic acid. But it may contain as little as 4 per cent. Most vinegar used in commercial food processing contains from 12 to 15 per cent acetic acid.

A kind of vinegar called *distilled alcoholic vinegar* or *spirit vinegar* is commonly used by commercial food processors. It is produced by boiling the fermented liquid and then condensing and collecting the vapour that forms. The distilled liquid can be transported economically in a concentrated form to commercial users, who then acetify it. This kind of vinegar loses much of its flavour in the distilling process.

See also **Acetic acid; Cider; Fermentation.**

Vinegar eel is a tiny roundworm that lives in vinegar. Vinegar eels are usually found in barrels or jars of non-pasteurized cider vinegar. They feed on fruit pulp and the bacteria that produce the vinegar from the cider. Vinegar eels are harmless when swallowed. The vinegar eel is slender and threadlike and about 1.5 millimetres long. There are separate males and females. Most females live about ten months and produce as many as 45 tiny larvae, which are about 0.25 millimetre long.

Scientific classification. The vinegar eel is *Anguillula aceti* and belongs to the roundworm phylum, Nematoda.

See also **Roundworm.**

Viner, Charles. See **Blackstone, Sir William.**

Vineyard. See **Grape.**

Vinland is the name early Scandinavian explorers gave to a region on the east coast of North America. Many historians believe that Norwegian Vikings visited this coastal area almost 500 years before Christopher Columbus sailed to America in 1492. Some historians believe Vinland was probably in the region of Cape Cod, Massachusetts, U.S.A. Others believe it was in Newfoundland, Canada. In 1961, the remains of a Viking settlement were found at L'Anse aux Meadows, Newfoundland.

Early Norse *sagas* (stories of heroic deeds) tell of the explorers' voyages. Many historians do not consider these stories as completely reliable. These tales describe a fertile land with a mild climate. The Norsemen called the region *Vinland* (also spelled *Vineland* or *Wineland*) because of the grapes that grew there. The sagas tell that Leif Ericson, son of Eric the Red, visited Vinland about A.D. 1000. Historians believe the Norsemen had to abandon Vinland because they could not defend their settlements against hostile Indians.

Vintage and veteran cars provide an absorbing hobby for many people. Vintage and veteran car enthusiasts collect, preserve, restore, and drive beautifully designed older motorcars.

Enthusiasts make a strict distinction between veteran and vintage cars. A *veteran* car is any car built in the period up to Dec. 31, 1918. A *vintage* car is one built during the period between Jan. 1, 1919, and Dec. 31, 1930.

Many veteran cars date in design from before the 1900's. For example, the earliest Cannstatt-Daimler appeared in 1894. Other *models* (types) of veteran cars include the earliest examples of makes whose names are still familiar today, such as Peugeot, Renault, Mercedes, Ford, and Rolls-Royce.

Enthusiasts spend many hours restoring and rebuilding vintage and veteran cars, such as this rare Rolls-Royce Phantom.

Vintage cars include the post-1918 versions of many models carried over from the veteran period, such as the Rolls-Royce Silver Ghost. Models first designed in the vintage period include Alfa-Romeos, Bugattis, and the Austin Seven.

Many people interested in veteran and vintage cars belong to clubs which organize rallies and other events. The Brighton Veteran Car Rally, in the United Kingdom, is one of the best known of these occasions.

Vinyl is one of the most useful plastics materials ever developed. Vinyl plastics, often called simply *vinyls,* are durable and inexpensive. They can be used in making a wide variety of products, including gramophone records and leatherlike upholstery. Manufacturers make vinyl plastics from such natural substances as natural gas, petroleum, and salt.

Characteristics. Vinyls may have the stiffness of wood or the flexibility of cloth. They may be any colour, and they may be transparent. Vinyls do not break or tear easily, and they rarely are harmed by acids, alcohol, oils, or water. Products made of *rigid* (stiff) vinyl may begin to lose their shape at a temperature of about 66° C. Most vinyls burn slowly.

Rigid vinyl products include containers, toys, and water pipes. Flexible vinyl items include electrical insulators, floor tiles, garden hoses, shower curtains, and leather-like clothing and luggage. Vinyl coatings keep cardboard milk cartons from becoming soggy and enable wallpaper to resist stains.

All vinyl plastics contain a chemical substance called *vinyl,* which has the formula CH_2CH-. Manufacturers combine vinyl with various other substances to produce several kinds of vinyl plastics. For example, combining vinyl with chlorine produces a gas called *vinyl chloride.* Through the process of *polymerization,* this gas is then used to produce a solid plastic, *polyvinyl chloride* (PVC). See **Plastics** (How plastics are made); **Polymerization.**

History. In 1927, PVC became the first vinyl plastics material to be manufactured commercially. Over the years, chemists improved vinyl plastics, and manufacturers found many new uses for these materials. During the mid-1970's, research indicated that serious illnesses, including a form of liver cancer, may result from breathing air polluted with vinyl chloride, the gas used in making PVC. Today, laws in many countries require plastics manufacturers to instal equipment to all but eliminate vinyl chloride from the air breathed by workers.

See also **Linoleum** (History).

Vinyl chloride. See **Vinyl.**

Viol is the name of a class of stringed instruments played with a bow. Viols were very popular during the 1500's and 1600's. By about 1750, they had been largely replaced by other stringed instruments, including the viola and the cello. Interest in viol playing revived during the early 1900's.

Viols resemble instruments of the violin family. But unlike violins, viols have a flat back and sloping shoulders. Bows and the way in which a viol player holds the bow also differ. Most viols have six strings that are thinner than violin strings. The instruments are made in several sizes, ranging from soprano—the smallest—to bass—the largest. Players hold the smaller viols upright on their lap. They hold the larger ones between their knees.

See also **Bass; Cello; Viola; Violin.**

Viola is a stringed musical instrument that resembles a large violin. The viola serves as the tenor voice in the violin family, with the violins taking the higher parts and the cello and bass taking the lower parts. Like the other members of the violin family, the viola has four strings and is played with a bow. The instrument has a range of more than three octaves, and produces a distinctive rich, velvety sound.

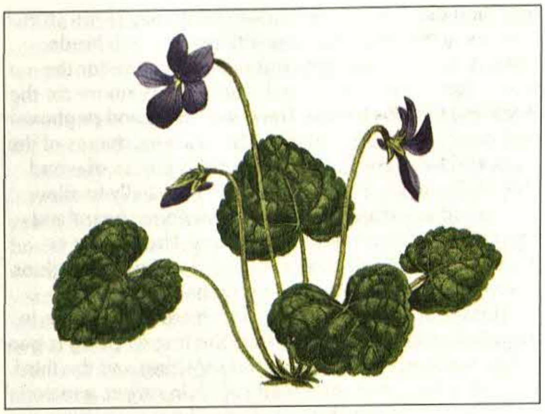
The viola looks like a large violin, and the musician holds and plays it like a violin. But the viola has a full, rich tone and a pitch lower than that of a violin.

The viola originated in the 1500's. Since the late 1700's, it has had a prominent role in symphonic music and chamber music. Composers such as Hector Berlioz, Richard Strauss, and Sir William Walton, have written for the viola as a solo instrument.

Violence. See **Crime; Revolution; Riot; Terrorism.**

Violet is the common name of a group of flowering plants. Their blossoms are among the most attractive of all flowers. Violets grow throughout most of the world, especially in temperate regions and in mountainous areas of the tropics. They bloom in groups in early spring. Heart-shaped leaves partly conceal the five-petalled flowers. Each flower grows on a slender stalk. There are more than 500 species of violets. Some varieties of violets bear white and yellow flowers, but the blue and purple violets are world favourites.

The *sweet violet* of Europe and Asia gets its name from the extremely sweet smell of its deep, blue-purple flowers. It blooms early in the spring, in shady places such as woods and hedgebanks. Sweet violets are cultivated for their leaves, which are used to make tea, and for their flowers, from which an oil is extracted. The oil is used as a flavouring for sweets and liquors. The flowers of the sweet violet are *candied* (soaked in a sugar solution) and used in confectionery—for example, to decorate cakes.



Sweet violet gets the first part of its name from the sweet perfume of its flowers. The plant grows in shady places.

Another common species is the *dog violet.* It has pale, blue-purple flowers with petals that tend to overlap each other. It grows in woods, grassy places, and on mountains.

Pansies are types of violets with larger, more rounded petals that are generally pale coloured with darker markings. Many wild pansies are found on dry grassland areas such as short turf growing near the sea.

There are very many cultivated types of violets and pansies. The plant known as *African violet* belongs to a different family.

Scientific classification. Violets belong to the violet family Violaceae. The sweet violet is *Viola odorata,* and the dog violet is *V. canina.* African violets belong to the family Gesneriaceae.

See also **Flower** (picture: Garden perennials); **Pansy.**

Violin is a stringed instrument that is played with a bow. It is probably the best known and most widely used of all orchestral instruments. Some of the greatest music in the world owes much of its beauty to the violin. Such music may be the sound of a mighty orchestra, with dozens of violins playing together. Or it may be the music produced by one great master playing alone on a violin to a hushed audience.

Several other instruments are similar to the violin in construction and in method of playing. These include the cello and viola. They are considered members of the *violin family.*

Music for the violin covers a wide range. Some composers, such as Johann Sebastian Bach, Eugene Ysäye, and Béla Bartók, have written music for the violin alone. Many composers have written pieces for the violin with piano or orchestral accompaniment. The violin also has an important role as part of a group of instruments, as in an orchestra or in a string quartet.

Parts of the violin. A violin is a special kind of box that *amplifies* (makes louder) the sound of the strings stretched across it. If you stretch a piece of string tightly and then pluck it, you will hear a faint note. If you stretch it across a wooden box, you will hear a much louder note. A violin-maker uses soft pine or spruce for the *belly* (front) of the violin, and maple or sycamore for the *back* and the *ribs* (sides). The *head* (scroll and pegbox) and *neck* are made of maple. The graceful shapes of the back and belly are carved out of solid pieces of wood. The violin-maker cuts two *f-holes* in the belly to allow the sound to escape, and makes the *finger board* and the *tailpiece* (string-holder) of ebony. Ebony is an extremely hard, longlasting wood. The violin-maker glues the violin parts together, using no nails or screws.

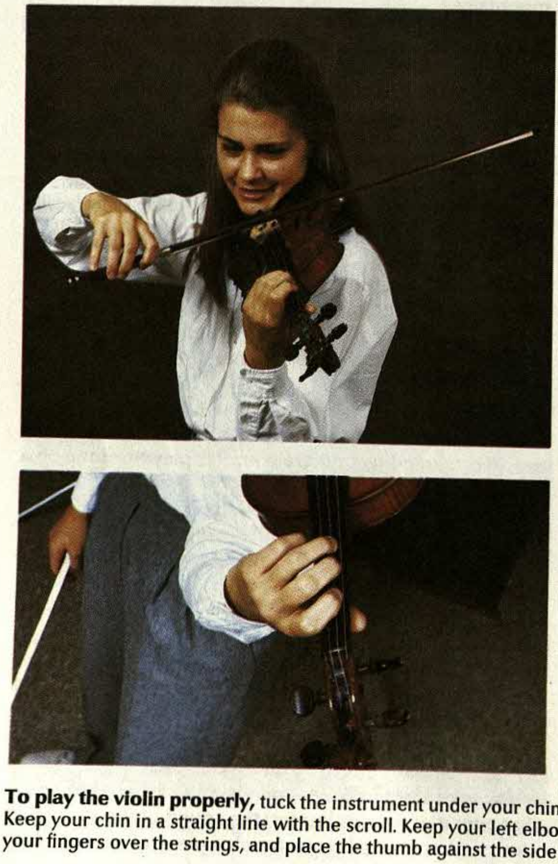
The violin has four *strings,* which are tuned in the interval of a fifth from each other. The first *(E)* string is generally made of steel. The second *(A)* string and the third *(D)* string are sometimes made of plain *catgut,* a material made from the intestines of sheep. But most players prefer to use *A* or *D* strings made of a thinner gut overwound with fine aluminium wire. Synthetic materials such as nylon are also used. The fourth *(G)* string is generally made of gut covered with silver or copper wire. The strings are attached to pegs set in the head. The player tightens the strings with these pegs to tune them.

There are two other important parts of the violin that are not permanently glued to the body. The *bridge* stands on the belly, midway between the two *f*-holes. It supports the strings. A pattern of holes is cut into the bridge to give it greater flexibility. The *sound-post,* a thin rod of pine, is wedged between the back and the belly underneath the bridge, inside the violin. The sound-post conducts the sound from the front to the back of the violin. It also supports the belly against the pressure of the strings. The sound-post is slightly behind one foot of the bridge. The *bass-bar,* a bar of pine that is glued on the underside of the belly, gives further support for the belly. It runs lengthwise underneath the other foot of the bridge.

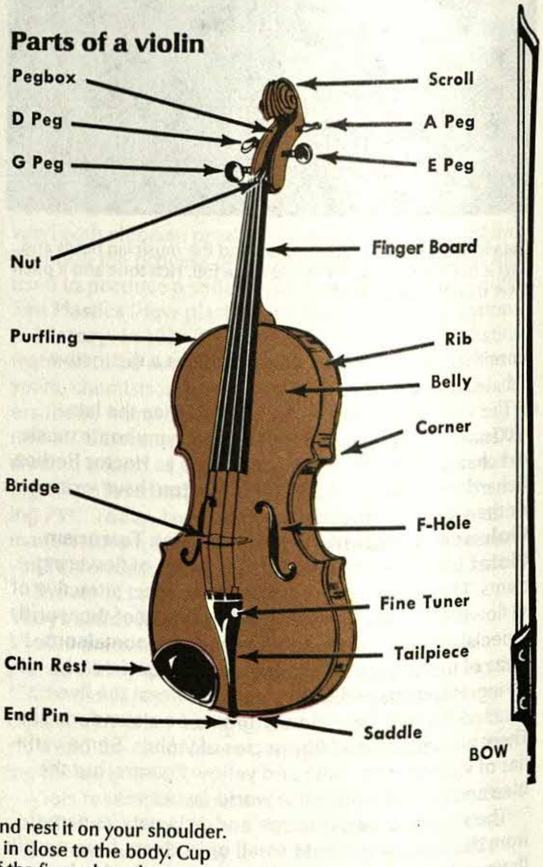
The bow is a curved, springy stick about 70 centimetres long that has a flat ribbon of hair attached to it. This ribbon consists of more than 150 horsehairs. The hair is attached to the point of the bow and to a sliding wood block called a *frog* or *nut* at the other end, near the point at which the violinist holds the bow. By turning a screw set into the end of the bow, the player can move the frog back and forth to tighten the hair against the spring of the bow. The bow is usually made of *Pernambuco,* a light, springy wood.

Playing the violin. The player tucks the end of the violin between the chin and the left shoulder. To obtain a good grip, the player uses a *chin-rest* clamped to the top of the violin, and a *shoulder-rest* or a *pad* between the back of the violin and the shoulder. The violin should be supported entirely without the aid of the player's left hand. The bow is held in the player's right hand.

The player makes the strings of the violin vibrate by drawing the hair of the bow across them. Each of the separate strands of hair on the bow is rough, with minute projections. These projections make the strings vi-



To play the violin properly, tuck the instrument under your chin and rest it on your shoulder. Keep your chin in a straight line with the scroll. Keep your left elbow in close to the body. Cup your fingers over the strings, and place the thumb against the side of the finger board.



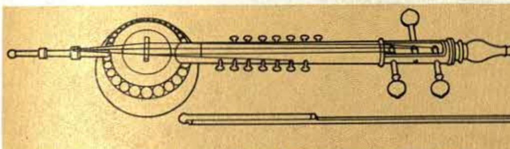
Parts of a violin

brate as the bow slides over them. The player can vary the loudness of the tone and get other special effects by changing the way in which the bow is drawn across the strings. The player can also pluck the strings with the fingers, a form of playing known as *pizzicato.*

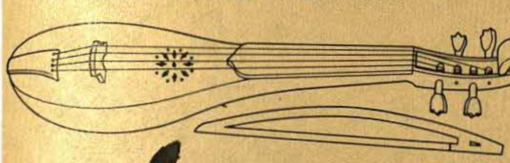
Violinists practise for years to perfect their skills, but very little strength is required to play the violin well. Improvement is usually the result of using less tension in the hands, arms, and body. The finest violinists make playing look easy, with a minimum of muscle activity.

Historic violins

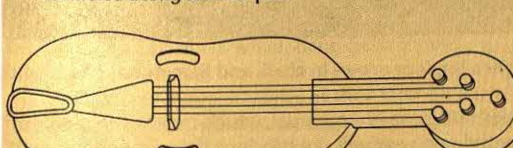
The first reference to stringed instruments appears in Persian and Chinese writings from the 800's. Developments over the next 800 years led to the superb violins of Stradivari.



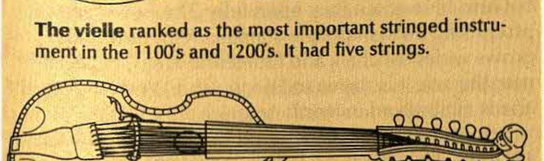
The kemantche, an ancient Persian instrument, consisted of a stick extending through half of a coconut.



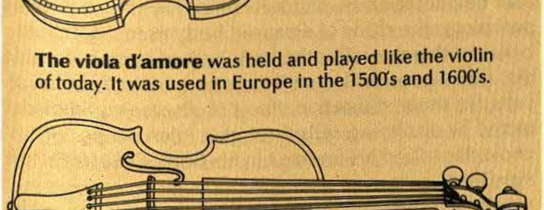
The European rebec was popular in medieval times. It resembled a long slender pear.



The vielle ranked as the most important stringed instrument in the 1100's and 1200's. It had five strings.



The viola d'amore was held and played like the violin of today. It was used in Europe in the 1500's and 1600's.



Violins made by Antonio Stradivari in the late 1600's and early 1700's are famous for their tone and power.

The strings of the violin give the player four notes. To obtain other notes, the player shortens the vibrating length of the strings by pressing them down on the finger board with the fingers of the left hand. Flutelike tones called *harmonics* can be produced by touching the strings lightly in certain places.

History. Musicians have used many kinds of stringed instruments, such as harps and lyres, for thousands of years. But no one knows when players began to use bows, instead of just plucking the strings. Chinese players used bowed instruments in the A.D. 900's. A hundred years later, musicians used forms of bowed instruments in many countries of Asia, Europe, and northern Africa. In the 1400's, players started using bows to play instruments of the guitar family. These bowed guitars developed into the instruments called viols.

Violins date from the 1500's. They were developed from the early bowed instruments. For many years, viols and violins developed side by side, each influencing the other. But by the late 1600's, most musicians favoured the violin family, and the viols dropped out of use.

The little Italian town of Cremona became the most important centre of violin making. Members of the Amati family made fine instruments there in the late 1500's and early 1600's. Later in the 1600's, Antonio Stradivari, a pupil of the Amatis, perfected the design of the violin and produced some of the finest violins. Another great family was that of Guarneri. The violins of Giuseppe Guarneri, known as Guarneri del Gesù, rival those of Stradivari. A Frenchman, Françoise Tourte, perfected the modern bow in the late 1700's.

From the 1600's to the early 1800's, many outstanding violinists were also the main composers for violin. Their works led to developments in playing technique. Among the most important of these composers were Arcangelo Corelli, Antonio Vivaldi, Giuseppe Tartini, Giovanni Viotti, Pierre Rode, Rodolphe Kreutzer, and Niccolò Paganini. Viotti has been called the father of modern violin playing. He greatly improved and extended the use of the violin bow.

Great violinists of the 1900's include Jascha Heifetz, Fritz Kreisler, Yehudi Menuhin, Nathan Milstein, David Oistrakh, Itzhak Perlman, Isaac Stern, and Pinchas Zukerman. There is much interest today in performing violin music composed in the 1700's with bows of that period. Their thinner wood and lighter bow and the gut strings then widely used result in a more gentle sound, especially when accompanied by a harpsichord rather than a modern piano.

Related articles in ***World Book*** include:

Violinists

Corelli, Arcangelo
Heifetz, Jascha
Kreisler, Fritz
Menuhin, Yehudi
Milstein, Nathan
Oistrakh, David
Paganini, Niccolò
Perlman, Itzhak
Stern, Isaac
Tartini, Giuseppe
Vivaldi, Antonio
Zukerman, Pinchas

Other related articles

Amati family
Bass
Cello
Guarneri
Music (Stringed instruments)
Stradivari, Antonio
Suzuki method
Viol
Viola

Violoncello. See Cello.

Viper is any one of a group of poisonous snakes. Vipers have a pair of long, hollow fangs in the upper jaw. Many of them have a deep hollow in the side of the head, a little lower than the eye and in front of it. Snakes with this hollow, or pit, are *pit vipers.* Over half of the vipers have pits. Those without it are *true vipers.*

True vipers live in Africa, Europe, Asia, and the East Indies. Pit vipers live in the Americas, the East Indies, Asia, and Europe east of the lower Volga River. Of every 100 snakes, about eight are vipers.

A viper's poison is formed in special glands. The hollow fangs then carry it into the victim's body the way a hypodermic needle injects serum. All vipers can be dangerous to people, but many of the small kinds rarely, if ever, kill anyone with their bite. Certain kinds of large vipers will bite only in self-defence, for example, if someone teases or annoys them.

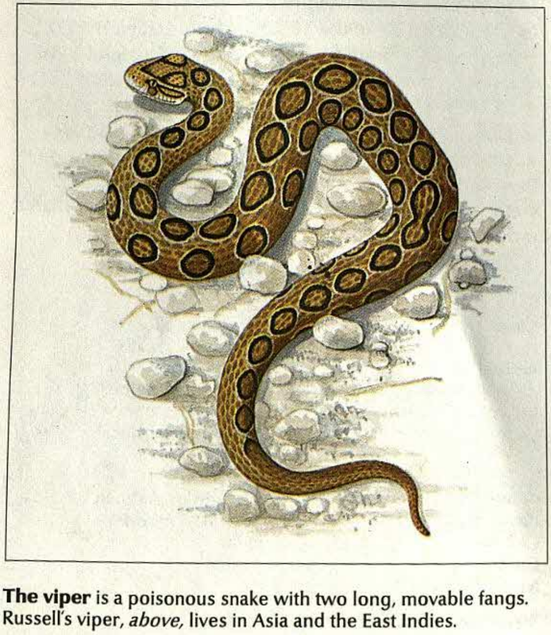
Vipers have a head much broader than the neck, and eyes with catlike pupils, but so do many other snakes. Vipers, therefore, cannot be recognized with certainty by the shape of the head and pupils. The majority of vipers have thick bodies and rather short tails.

The facial pit of the pit viper is connected with the brain by a well-developed nerve. The nerve, a sense organ, is highly sensitive to heat. It helps the pit viper to locate and secure its warm-blooded prey.

The *common viper,* or *adder,* is the only poisonous reptile of the United Kingdom and northern Europe. Other familiar true vipers include the *Gaboon viper* and *puff adder* of Africa, and *Russell's viper* of Asia and the East Indies. Most true vipers bear their young alive.

Pit vipers include the *rattlesnakes,* which live from southern Canada to Argentina, and the *bushmaster* and *fer-de-lance* of tropical America. Only the bushmaster lays eggs. The others bear their young alive.

Scientific classification. Vipers make up the viper family, Viperidae. True vipers belong to the subfamily Viperinae. The common European viper, or adder, is *Vipera berus.* Other true vipers include the Gaboon viper, *Bitis gabonica;* the puff adder, *B. arietans;* and Russell's viper, *Vipera russelli.* Pit vipers belong to the subfamily Crotalinae. They include the rattlesnakes, which are genera *Crotalus* and *Sistrurus;* the bushmaster, *Lachesis muta;* and the fer-de-lance, *Bothrops atrox.*

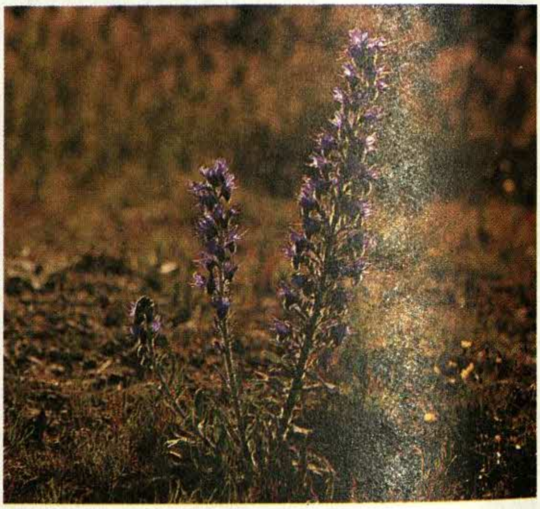


The viper is a poisonous snake with two long, movable fangs. Russell's viper, *above,* lives in Asia and the East Indies.

Related articles in ***World Book*** include:

Adder
Bushmaster
Copperhead
Fer-de-lance
Rattlesnake
Snake
Water moccasin

Viper's bugloss is a hairy plant that has a spotted stem and showy blue flowers. The flowers grow on a large flower spike that can be up to 25 centimetres long.



Viper's bugloss grows in chalk and limestone soils.

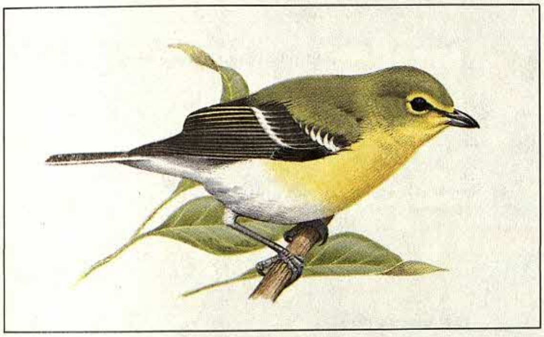
Viper's bugloss is a *biennial,* which means that seeds planted one year will not produce flowers until the next year. The flowers are reddish when they are budding, but turn blue when they open fully. The flowers have protruding pinkish-purple stamens. Viper's bugloss grows widely in chalk and limestone areas, especially near the sea. It is native to Europe and Western Asia, and is naturalized in North America.

Scientific classification. Viper's bugloss belongs to the borage family, Boraginaceae. It is *Echium vulgare.*

Virchow, Rudolf (1821-1902), was a prominent German doctor, scientist, and statesman. He helped develop *pathology* (the study of diseased body tissue). Virchow believed that the cell is the basic unit of human life and that disease results from disturbances in the function of cells. He showed that the effects of disease could be detected by observing cells through a microscope. Virchow described his findings in his book *Cellular Pathology* (1858).

Virchow believed that some diseases were caused by bad living conditions, and he devoted his political career to promoting social reform and public health. He participated in the Revolution of 1848, a series of European uprisings for greater political freedom. In 1859, he was elected to the Berlin City Council, where he argued that every citizen had a constitutional right to health. In 1861, Virchow was elected to the Prussian National Assembly. From 1871 to 1893, he served in the Reichstag (parliament) of Germany. Virchow was born in Schivelbein (now Świdwin, Poland).

Vireo is the name of a family of small songbirds. They stay close to the foliage in the forests, and feed on insects. There are over 40 species, all natives of the New World. Vireos have stout beaks with a tiny hook on the upper part of the bill. They tend to have drab plumage, green, grey, or brown above, with pale underparts.



The yellow-throated vireo lives mainly in tropical forests of North America. These tiny birds build nests high in treetops.

The best-known vireo is the *red-eyed vireo* of North America. People can recognize this bird by its red eyes, which have a white line with a black border above them. Its song sounds conversational, as if the bird were talking to any listener. Since it repeats this note continually, the vireo is often called the *preacher bird.* The *yellow-throated vireo* has bright yellow underparts. Vireos build cup-shaped nests which hang from forked branches in the trees.

Vireos are considered useful as they feed on harmful insects such as caterpillars that they take from the foliage and branches of trees. Like flycatchers, they can capture insects in midair. Vireos also eat some fruit.

Scientific classification. Vireos make up the family Vireonidae. The red-eyed vireo is *Vireo olivaceus,* and the yellow-throated vireo is *V. flavifrons.*

Virgil (70-19 B.C.), also spelled *Vergil,* was the greatest poet of ancient Rome and one of the outstanding poets in world literature. His masterpiece was the *Aeneid,* the national epic of Rome.

His life. Virgil was born in Andes, a tiny village near Mantua in northern Italy. His full name was Publius Vergilius Maro. Virgil attended school in Cremona and Milan and then studied rhetoric in Rome and philosophy in Naples. He prepared for a career as a lawyer, but he was too shy and preferred the private life of a poet. His first poems won him the patronage of Maecenas, a wealthy lover of the arts and political adviser to the future Emperor Augustus. Maecenas gave Virgil a house near Naples and encouraged him to write poems about Italy and its history.

Virgil died before he could finish the *Aeneid.* He left instructions to destroy it because he did not think it was good enough. However, Augustus refused to permit the poem's destruction.

His works. The first poems definitely attributed to Virgil are the *Eclogues,* or *Bucolics,* composed between 42 and 35 B.C. These 10 poems are *pastorals*—that is, they portray scenes from the lives of shepherds. In writing the *Eclogues,* Virgil imitated the Greek pastoral poems of Theocritus, but Virgil adapted their settings and themes to the Italian countryside. The fourth eclogue prophesies the birth of a wonderful child who will bring in a new age. After Rome became Christian under the emperor Constantine the Great in the early A.D. 300's, many people thought the prophecy referred to the birth of Jesus.

Virgil spent about seven years writing the *Georgics,* a poem in four books, which was published in 29 B.C. On one level, the *Georgics* is a poem of advice to farmers. The first book deals with crops, the second with vines and olive trees, the third with breeding cattle and horses, and the fourth with keeping bees. But the *Georgics* goes beyond practical instruction to show the origin of civilization in the endless work of farming and to celebrate the beauty of Italy and its country life. The books on animals suggests the weaknesses and strengths of human beings and their sufferings in love, war, and sickness. Similarly, the world of the beehive is a model for the life of a human city under its ruler.

For the story of the *Aeneid,* Virgil used many sources. The most important were the *Iliad* and the *Odyssey,* the two great Greek epics attributed to Homer. Virgil based the first six books of the *Aeneid* on the *Odyssey* and the last six on the *Iliad.* The *Aeneid* describes the adventures of Aeneas, the legendary Trojan hero who survived the fall of Troy to the Greeks. Aeneas sailed westward to Italy. There he formed a new nation where his descendants founded the city of Rome. The poem is not just the story of Aeneas. It shows Rome as the fulfilment of a divine plan and mentions the greatest achievements of Roman history up to the time of Virgil.

Virgil treats Aeneas as the ancestor of Augustus. He showed that just as the gods appointed Aeneas to create the people of Rome, so they appointed his descendant Augustus to save Rome and re-create the city after the Roman civil wars of the 40's and 30's B.C. In this way, Virgil glorified both Augustus and his country, but also reminded Romans that power must be used to benefit others and to bring peace to the world.

His influence. Roman schools began to use Virgil's works as textbooks soon after his death. Copies of the *Aeneid* were kept in Roman temples, and people practised prophecy by opening the poem at random and interpreting the first words they saw. Later, Christian writers used verses from Virgil's poems to express Christian beliefs. During the Middle Ages, people thought of Virgil as a prophet who had foreseen the coming of Jesus. Some even believed he had been a magician.

The Italian poet Dante Alighieri based his great epic *The Divine Comedy* (1321) on the sixth book of the *Aeneid.* In Dante's poem, it is Virgil who guides the poet on his journey through Hell and Purgatory.

During the Renaissance, Virgil's *Eclogues* influenced the pastoral poetry of such writers as Petrarch in Italy, Joachim du Bellay in France, and Sir Philip Sidney in England. In the 1500's and 1600's, English writers regarded Virgil as the ideal poet. The poet John Milton imitated Virgil in his own works, especially *Paradise Lost* (1667). The poet John Dryden translated the *Aeneid* into English verse in the late 1600's. Virgil also influenced many poets of the 1800's, including William Wordsworth and Lord Tennyson. In the 1900's, the poet T. S. Eliot admired and imitated Virgil's poetry, and there are fine modern translations of the *Aeneid* by American and British poets.

See also **Aeneid; Latin literature** (The Augustan Age).

Virgin Islands, British, are a dependency of the United Kingdom located in the West Indies. The group of islands lies in the eastern Caribbean Sea, 100 kilometres east of Puerto Rico, near the northern end of the Leeward Islands, part of the Lesser Antilles. A channel called *the Narrows* separates the British Virgin Islands from the Virgin Islands of the United States. See **Leeward Islands; Virgin Islands of the United States.**

The British Virgin Islands dependency consists of more than 60 small islands and *cays* (low sand banks). Only 16 are inhabited. The largest inhabited islands are Anegada, Jost van Dyke, Tortola, and Virgin Gorda. Road Town, on Tortola, is the capital.

Government. The United Kingdom's monarch is the head of state of the British Virgin Islands. A governor is the monarch's representative in the islands and is responsible for defence, foreign affairs, internal security, and the operation of the courts and the civil service. The parliament consists of a six-member *executive council* and a nine-member *legislative council.* The governor appoints a chief minister from the majority political party in the legislative council. Elections are held every four years.

People. About 16,000 people live in the British Virgin Islands. About a quarter of the population live in Road Town. More than 90 per cent of the people are of African descent. The rest are of European or Asian ancestry. The official language is English.

Primary and secondary education are free. The British Virgin Islands have 29 primary and preprimary schools, 4 secondary schools, and a community college.

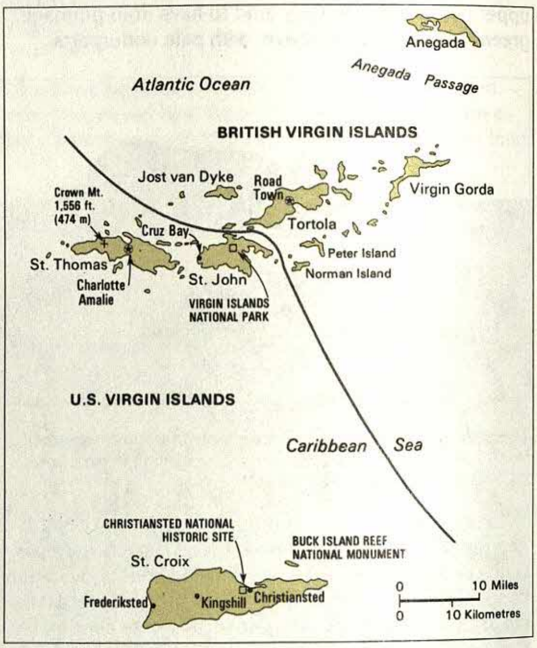
Land and climate. The British Virgin Islands occupy an area of 153 square kilometres. Tortola is 54 square kilometres in area. The islands are mostly volcanic and mountainous except Anegada, a low-lying coral island. Mount Sage, on Tortola, rises to 542 metres above sea level, the highest point on the islands.

Tourists enjoy the rolling hills, good beaches, and the clear waters around the islands. With their subtropical climate, the British Virgin Islands experience temperatures that range between 26 ° and 31 °C in summer and 22 ° and 28 °C in winter. Average annual rainfall is about 120 centimetres.

Economy. Service industries, especially tourism and the financial services offered to foreign companies, are the most important parts of the economy. Agriculture plays little part in the economy because the soil is infertile and cannot support many crops. But farmers grow some fruit and vegetables and some sugar cane for use in the manufacture of rum. Some farmers rear cattle and other livestock. Local quarries produce stone and other materials used in building and construction. Local mines produce salt. Oil and other fuels are imported. Chief exports include beef cattle, fish, bananas, other food items, and rum.

History. In 1666, sugar planters from England took over control of the islands from Dutch settlers who had held them since 1648. The planters brought in Africans as slaves to work on the plantations. In 1872, the British Virgin Islands came to be administered as part of the Leeward Islands. In 1956, they became a separate colony.

The Virgin Islands are part of the Leeward Islands in the Lesser Antilles. The United States controls about seven-tenths and the United Kingdom three-tenths of the islands.

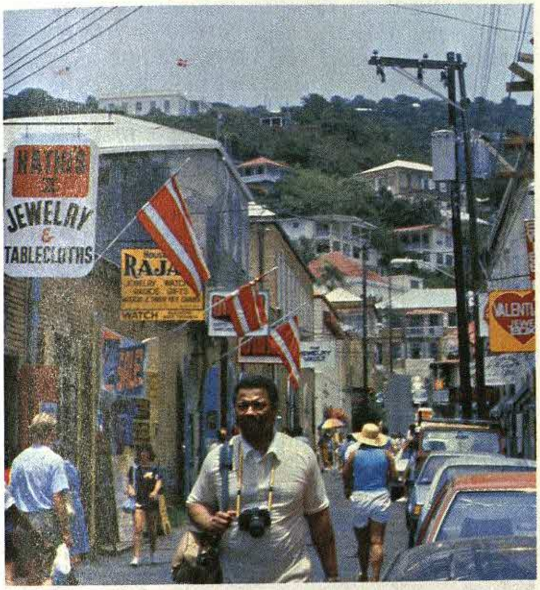


The British Virgin Islands stayed outside the West Indies Federation so that they could retain their economic links with the neighbouring Virgin Islands of the United States. The British Virgin Islands received a Constitution in 1967, revised ten years later.

In the late 1980's, successive governments were criticized for alleged financial corruption. In November 1990, H. Lavity Stoutt, leader of the Virgin Islands Party, became chief minister and minister of finance. Stoutt's government faced the major problems of illegal drug trafficking, illegal immigration, and irregularities in the island's financial business.

Virgin Islands of the United States (pop. 111,000) is the name of a group of small islands that lie about 65 kilometres east of Puerto Rico. The group forms the westernmost part of a great chain of West Indian islands called the Lesser Antilles (see **West Indies**). The U.S. Virgin Islands are separated by a channel called *the Narrows* from the British Virgin Islands (see **Virgin Islands, British**). The U.S. Virgin Islands cover 342 square kilometres. They consist of three major islands—St. Croix, St. John, and St. Thomas—together with many nearby islets.

Land and climate. All the islands, except for St. Croix, are rugged and hilly. Hills on the three major islands reach heights of 300 to 470 metres above sea level. Only St. Croix, St. John, and St. Thomas are inhabited. Charlotte Amalie, on St. Croix, is the capital.



St. Thomas in the U.S. Virgin Islands offers bargain prices on such goods as perfume, watches, and fine china.

The islands have a delightful tropical climate. The growing season never ends. Trade winds blow over the islands most of the year, and there are no extremes of heat or cold. The temperature ranges from 21° to 32° C and averages 26° C. The islands receive from 100 to 150 centimetres of rainfall a year.

People. Of every 100 islanders, 70 are black and 18 are white. The rest are of mixed ancestry or belong to other population groups. The islanders speak and read English.

Economy. The tourist industry is the islands' major industry. More than a million tourists visit the islands each year. Tourist-related jobs account for more than half of the employment on the three islands.

Two distilleries on the islands make rum. But many new industries have also been started on the islands. These industries include an aluminium ore refining plant, an oil refinery, a knitting mill, and factories that make perfume, thermometers, and watches.

Most of the islands' food must be imported. But there is some farm income from beef cattle and dairy herds. Eggs are a major farm product on the islands.

History. Christopher Columbus sighted the Virgin Islands in 1493. Warlike, cannibalistic Carib Indians lived there and fought with members of Columbus' crew. All the Indians had died or left by the time the British and Danes began settlement of St. Croix in the 1600's. See **Carib Indians.**

Within a few years, the island fell to the Spaniards and then to the French. In 1733, the French sold St. Croix to the Danes. After prolonged Danish rule, control of the Virgin Islands passed to the United States in 1916. In 1927, the islanders became citizens of the United States. In 1968, the islanders were given the right to elect their own governor.

Virgin Mary. See Mary.

Virgin of Guadalupe. See Mexico (Religion).

Virginal is a keyboard instrument that resembles a harpsichord. A virginal has a rectangular case, and the keyboard is on one of the longer sides. When a player presses the keys down, small pieces of quill or leather pluck the metal strings. The virginal has a light, clear, and somewhat tinkling tone. It was especially popular as a solo instrument in England during the 1500's and early 1600's. The English *Fitzwilliam Virginal Book* (about 1625) contains nearly 300 compositions and is the principal collection of music for virginals.

Virginia, a state in the Southern United States, was the site of some of the most important events in American history. The first permanent English settlement in America was made at Jamestown in 1607. Great battles of the American Revolution and the American Civil War were fought in Virginia. Virginia has been called *Mother of Presidents* because eight U.S. presidents were born there.

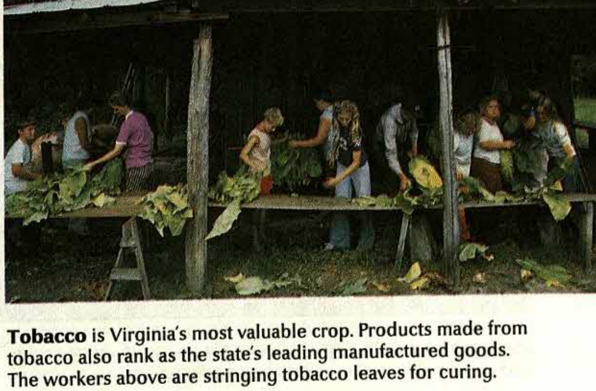
Virginia attracts tourists to its battlefields, famous old churches, colonial homes, and other historic sites. Many also go there to see Virginia's beautiful scenery. Richmond is the capital of Virginia.

Land. Southwestern Virginia is a rugged plateau covered with forests. Streams have cut deep gorges in some places. The region has valuable coal fields. Several parallel mountain ridges extend northeast and southwest along most of the state's western border. A series of river valleys lies in the eastern part of that region.

The Blue Ridge, the main eastern range of the Appalachian Mountain System, borders the ridge and valley region. The Blue Ridge is an outstanding feature of Virginia. A large, elevated, gently rolling plain lies to the east of the Blue Ridge.

The Atlantic Coastal Plain of eastern Virginia extends north and south along the Atlantic Ocean. It is often called the *Tidewater,* because tidal water flows up its bays, inlets, and rivers.

Economy. Service industries employ about three-quarters of Virginia's workers. Important activities within



Tobacco is Virginia's most valuable crop. Products made from tobacco also rank as the state's leading manufactured goods. The workers above are stringing tobacco leaves for curing.

Facts in brief about Virginia

Population: *1990 census*—6,216,568.
Area: 105,586 km².
Climate: *Average January temperature*—2° C. *Average July temperature*—24° C.
Elevation: *Highest*—Mount Rogers, 1,746 m. *Lowest*—sea level.
Largest cities: Norfolk, Virginia Beach, Richmond, Arlington.
Chief products: *Agriculture*—beef cattle, chickens, milk. *Manufacturing*—chemicals, electrical equipment, food products, transportation equipment, tobacco products. *Mining*—coal.
Origin of name: Queen Elizabeth I of England (known as the *Virgin Queen*).

the service industries include education, government, health care, and trade. The federal government employs many people in northeastern Virginia, an area that lies next to the United States national capital, Washington, D.C. Virginia also has several large military bases. Norfolk and Newport News have two of the busiest seaports in the United States.

The leading manufactured items in Virginia are chemical products and cigarettes. The state's chemical products include pharmaceuticals and synthetic fibres. Virginia's chief agricultural activities are raising cattle and poultry farming. Coal is mined in the southwestern part of Virginia.

History. When English colonists settled at Jamestown in 1607, Indian tribes of Algonquian, Siouan, and Iroquoian language groups lived in the Virginia region. America's first representative legislature was formed in Jamestown in 1619.

Virginia's leaders played important roles in America's struggle for independence. Thomas Jefferson wrote the Declaration of Independence. James Madison and other Virginians led in creating the U.S. Constitution. George Washington became the first U.S. president.

In 1831, Nat Turner, a black slave and preacher from Southampton County, led a famous slave rebellion.

Virginia *seceded* (withdrew) from the United States on April 17, 1861. Robert E. Lee, a Virginian, was the outstanding military leader of the Confederacy during the American Civil War (1861-1865). Many westerners in Virginia opposed secession. In 1863, 48 counties of northwestern Virginia became the state of West Virginia.

During the 1950's, some state schools in Virginia resisted federal orders to integrate. Following a growth of industry and pollution in the 1970's, efforts to clean up the Chesapeake Bay began during the 1980's.

See also **Jamestown; Lee, Robert E.; Norfolk.**

Virginia is one of the most northerly of the Southern States of the United States. It borders the North Atlantic Ocean.

Virginia creeper is the name of about 10 species of climbing plants of Asia and North America. The leaves have three lobes, or are divided into leaflets. Virginia creepers are grown in many countries for their brilliant red autumn foliage. They climb by means of tendrils tipped with hooks or sticky discs. The flowers of these plants are small and yellow-green, and the tiny berries are blue-black.

The *true Virginia creeper* of North America is a self-supporting creeper that has leaves made up of three to five coarsely toothed leaflets. Another popular species has three-lobed ivy-shaped leaves, and forms dense growths usually on flat surfaces such as walls. The young leader shoots of this species are a bright light green that contrasts with the darker coloured leaves of the main body of the plant. This species is native to China and Japan.

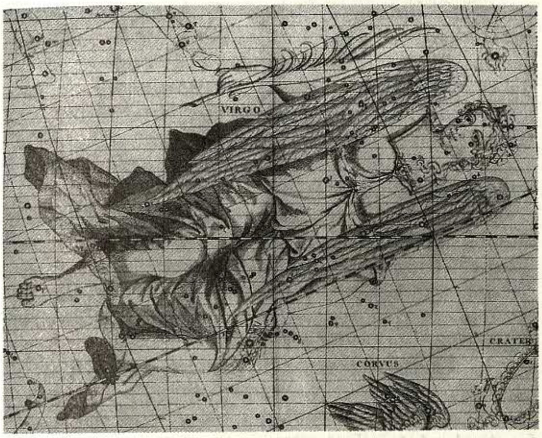
Virginia creeper adds brilliant colour to the surroundings in autumn when its leaves turn flaming red.

Scientific classification. Virginia creepers belong to the vine family, Vitaceae. The true Virginia creeper is *Parthenocissus quinquefolia,* and the "ivy-leaved" Virginia creeper is *P. tricuspidata.*

See also **Ivy.**

Virginium. See **Francium.**

Virgo, the *Virgin,* is the sixth sign of the zodiac. It is the second largest *constellation* (group of stars) in the sky. Some legends describe Virgo as a maiden holding an ear of wheat, and so it is a symbol of harvest. The ear of wheat is represented by the constellation's brightest star, Spica (a Latin word meaning "ear of wheat"). Another object in Virgo is Arich, a *binary* (double) star with two visible components. Their rotation makes their separation decrease as seen from the earth. They will look like one star by the end of the 1900's. Virgo also contains 3C 273, the brightest quasar (see **Quasar**). This quasar is not visible to the naked eye. The part of the sky that con-



Virgo is a group of stars that forms the sixth sign of the zodiac. This illustration is from *Atlas Coelestis* by John Flamsteed, published in 1729.

tains Virgo is very rich in faint, distant galaxies. The Sun passes through Virgo from mid-September to early November.

See also **Astrology; Astronomy; Binary star; Zodiac.**

Viroid is one of the smallest known agents of infectious disease. All known viroids are highly structured molecules of *RNA* (ribonucleic acid) that cause disease in certain plants. There are no known animal or human viroids.

Like viruses, viroids can reproduce only within living cells. However, viruses typically consist of a core of a nucleic acid surrounded by a coat of protein (see **Virus** [The structure of a virus]). Viroids lack a protein coat. In addition, viroids are at least 10 times as small as the smallest viruses.

Scientists have identified about a dozen viroid diseases of higher plants. These diseases affect such diverse crops as potatoes, citrus fruit, tomatoes, palms, cucumbers, hops, chrysanthemums, and avocados. Many of these diseases cause significant economic damage. For example, a disease that later proved to be caused by viroids nearly destroyed the chrysanthemum industry in the United States in the early 1950's.

The Swiss-born scientist Theodor Diener is credited with the discovery of viroids. In 1971, he published evidence that a particle that infected potatoes differed structurally from viruses. He proposed the term *viroid* to describe this submicroscopic particle.

Virology. See **Biology** (table); **Microbiology.**

Virtual image. See **Lens.**

Virtual reality is an artificial, three-dimensional environment created by a computer and various other devices. This equipment and special software manipulate the human senses—especially those of sight and hearing—to create the feeling of being inside a computer-generated world. A person using these devices can look at, and seem to handle, computer-generated images of objects as if the actual objects existed. Virtual reality systems are also called *virtual environments* or *synthetic environments.*

Today's virtual reality (VR) systems cannot duplicate the detail and complexity of the actual physical world, but the illusion they create is useful. VR systems are most widely used in video games. Other areas of application include architecture, engineering, medicine, and the training of athletes and pilots.

Most VR systems have a *head-mounted display* (HMD). An HMD consists of a headset or helmet that contains two miniature television screens, one for each eye. The HMD is connected by wire to the computer. The computer creates slightly different images on the screens. When seen together, these images produce a three-dimensional view.

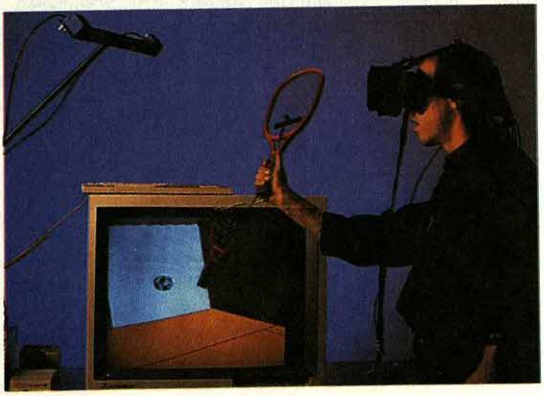
A tracking device, which is commonly built into the HMD, senses the direction in which the user of the system is looking. As the user's head moves, the computer updates the two images. Thus, the user feels as if he or she is looking around inside a computer-generated world.

Some HMD's have a small speaker for each ear. The system's computer generates sound in these speakers. The sound relates to the three-dimensional view in a way that strengthens the illusion of being inside an artificial world.

Another common VR device is a special glove that senses movements of the user's hand and even individual fingers. This glove is also connected to the computer. An image of the glove appears on the screens. As the user's hand moves, the computer causes the images of the glove to move in the same way. This system can create the illusion that the user is handling objects in the artificial world. Still another device, a motorized joystick, enables the user to feel what seems to be the weight or resistance of an object being handled.

Research on what developed into VR began in the early 1960's. When inexpensive flat TV screens became available in the late 1980's, a few companies began to sell HMD's. VR games appeared in stores and arcades in the early 1990's.

VR technology is not fully developed. For example, the sense of touch is used in only a few experimental systems. In addition, most systems can update only the simplest images quickly enough to keep up with the user's actual movements.



A virtual reality system such as the game shown above requires special equipment. A head-mounted display enables the player to see in three dimensions what is shown on the computer screen. A sensor on the racket sends data indicating the racket's movements to the computer, which modifies the image.

Virus is a microscopic organism that lives in a cell of another living thing. Although viruses are extremely small and simple, they are a major cause of disease. Some viruses infect human beings with such diseases as measles, influenza, and the common cold. Others infect animals or plants, and still others attack bacteria. Viruses produce disease in an organism by damaging some of its cells. However, viruses sometimes live in cells without harming them.

Viruses are so primitive that many scientists consider them to be both living and nonliving things. By itself, a virus is a lifeless particle that cannot reproduce. But inside a living cell, a virus becomes an active organism that can multiply hundreds of times.

Viruses are shaped like rods or spheres and range in size from about 0.01 to 0.3 micron. A micron is 0.001 millimetre. Most viruses can be seen only with an electron microscope, which magnifies them by thousands of times. The largest virus is about a tenth as big as a bacterium of average size.

The study of viruses began in 1898, when a Dutch botanist named Martinus Beijerinck realized that something smaller than bacteria could cause disease. He named this particle a *virus,* a Latin word meaning *poison.* In 1935, Wendell M. Stanley, an American biochemist, showed that viruses contain protein and can be crystallized. This research and other studies led to the development, in the 1950's, of vaccines for measles, poliomyelitis, and other diseases. *Virologists* (scientists who study viruses) demonstrated in the early 1900's that viruses can cause cancer in animals. In the 1980's, virologists linked viruses to some types of cancer in human beings.

The structure of a virus. Viruses, unlike other organisms, are not made up of cells. Therefore, they lack some of the substances needed to live on their own. To obtain these substances, a virus must enter a cell of another living thing. It then can use the cell's materials to live and reproduce.

A typical virus has two basic parts, a core of a nucleic acid and an outer coat of protein. The core consists of either *DNA* (deoxyribonucleic acid) or *RNA* (ribonucleic acid). The DNA or RNA enables the virus to reproduce after it has entered a cell (see **Nucleic acid**). Some RNA viruses contain an enzyme called *reverse transcriptase,* which converts virus RNA to a DNA copy inside cells. Such viruses are called *retroviruses.* The virus that causes AIDS (Acquired Immune Deficiency Syndrome) is a retrovirus. The coat of a virus consists of individual proteins that give the virus its shape. This coat protects the nucleic acid and helps the DNA or RNA get inside a cell. Some viruses have an additional outer membrane that provides further protection.

How a virus infects an organism. Most viruses reproduce in specific cells of certain organisms. For example, viruses that cause colds reproduce in cells of the human respiratory tract. Viruses cannot live outside their particular cells. They must be carried into the organism by air currents or some other means, and then transported by body fluids to the cells.

When a virus comes into contact with a cell that it can enter, it attaches itself to the cell at areas called *receptors.* Chemicals in the receptors bind the virus to the cell and help bring it or its nucleic acid inside. The nucleic acid then takes control of the cell's protein-making process. Previously, the cell made only the proteins specified by its own *genes.* The genes are the cell's hereditary structures, and they consist of nucleic acid. A cell that has been infected by a virus begins to produce the proteins that are called for by the nucleic acid of the virus. These proteins enable the virus to reproduce itself hundreds or thousands of times.

As new viruses are produced, they are released from the cell and infect other cells. The new viruses become lifeless as soon as they are released. But they return to life after entering another cell. The viruses then start to reproduce and thus spread infection to more cells in the organism.

When a virus reproduces, it changes the chemical makeup of a cell. This change usually damages or kills the cell, and disease results if many cells are affected. A few kinds of viruses change a cell only slightly because they do not reproduce. The DNA copy of a retrovirus may hide inside a cell on cell DNA. Such a virus may cause no immediate symptoms but might later infect the cell.

Virus diseases in human beings include AIDS; chickenpox; colds; cold sores; hepatitis, a liver disease; influenza; measles; mumps; poliomyelitis; rabies; and yellow fever. The nature of the disease caused by a particular type of virus is determined by which cells and tissues in the body the virus tends to invade.

The body protects itself from viruses and other harmful substances by several methods, all of which together are called the *immune system.* For example, white blood cells called *lymphocytes* provide protection in two ways. Some lymphocytes produce substances called *antibodies,* which cover a virus's protein coat and prevent the virus from attaching itself to the receptors of a cell. Other lymphocytes destroy cells that have been infected by viruses and thus kill the viruses before they can reproduce. However, some viruses are able to suppress the functioning of the immune system and thus enable themselves to reproduce more easily. Such viruses include those that cause measles, influenza, and AIDS.

Lymphocytes do not start to produce antibodies until several days after a virus has entered the body. However, the body has additional methods of fighting virus infections. For example, the body produces a high fever to combat such virus diseases as chickenpox and measles. The high fever limits the ability of the viruses to reproduce. To fight colds, the body forms large amounts of mucus in the nose and throat. The mucus traps many cold viruses, which are expelled from the body by sneezing, coughing, and blowing one's nose. The body also makes protein substances called *interferons* that provide some protection against all types of viruses.

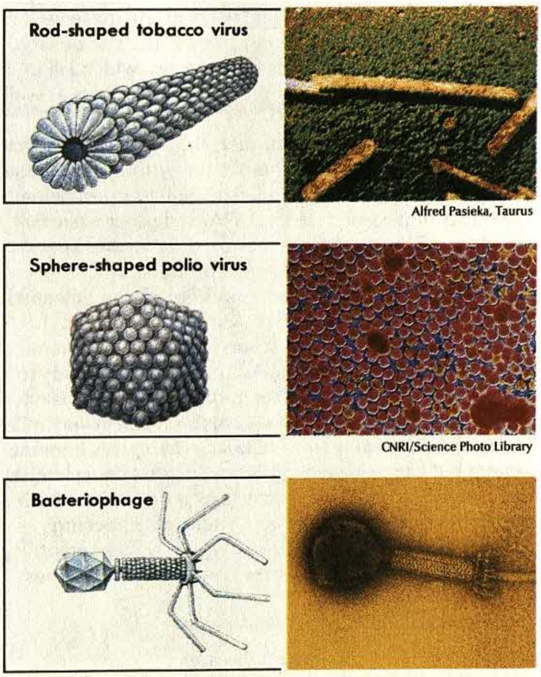
The treatment of a virus disease consists mainly of controlling its symptoms. For example, doctors prescribe aspirin to bring down a high fever. In most cases, doctors cannot attack the cause of the disease itself, because most drugs able to kill or damage a virus also damage healthy cells. A few drugs—including zidovudine (formerly called azidothymidine, or AZT), adenine arabinoside (ara-A), and acyclovir—are used on a limited scale against certain virus diseases. Researchers have found other potential antiviral drugs, including interferons. But these drugs must undergo further testing before their safety and effectiveness are known. Until then, the best way to deal with viruses is immunization before a virus disease strikes. Immunization with vaccines causes the immune system to produce antibodies that resist a virus when it enters the body. Doctors use vaccines to prevent such virus diseases as influenza, measles, and polio.

A few viruses are called *slow viruses* because they reproduce more slowly than the others. Many scientists believe such viruses result if an ordinary virus changes slightly. Some researchers believe a slow virus causes multiple sclerosis, a disease of the brain and spinal cord (see **Multiple sclerosis**). Other viruses, such as the herpes viruses, can remain dormant in cells for years and then become reactivated and cause sporadic outbreaks of symptoms. Still other viruses, including the AIDS virus, can cause prolonged, persistent infections in which the virus multiplies continuously.

Virus diseases in animals. Viruses cause hundreds of diseases in animals. These diseases include distemper in dogs and foot-and-mouth disease in cattle. Most virus diseases in animals occur in certain species. But some of the diseases spread to other species, and a few of them infect human beings. For example, dogs can give people rabies, which destroys nerve cells.

Certain viruses can cause cancer in animals. These viruses do not destroy all the cells they infect. Some of the infected cells have their chemical makeup altered, which causes them to behave abnormally. These altered cells reproduce in an uncontrolled manner, forming masses of tissue called tumours. Cancerous tumours invade and damage surrounding healthy tissue. Researchers have discovered a similarity between some viruses that cause cancer in animals and certain viruses that infect human beings. Although researchers have not proven that any human cancer is caused by a virus, some viruses have been linked to cancer. For example, hepatitis B virus causes prolonged liver infections, which may lead to liver cancer, and some leukaemias are caused by human retroviruses.

Virus diseases in plants. Viruses infect all kinds of plants and can cause serious damage to crops. Plant cells have tough walls that a virus cannot penetrate. But insects penetrate the cell walls while feeding on a plant and thus enable viruses to enter. Plant viruses may infect one or two leaves or an entire plant. They produce billions of viruses, which are then carried to other plants by insects or air currents. Common plant virus diseases include tobacco mosaic and turnip yellows mosaic.



Alfred Pasieka, Taurus

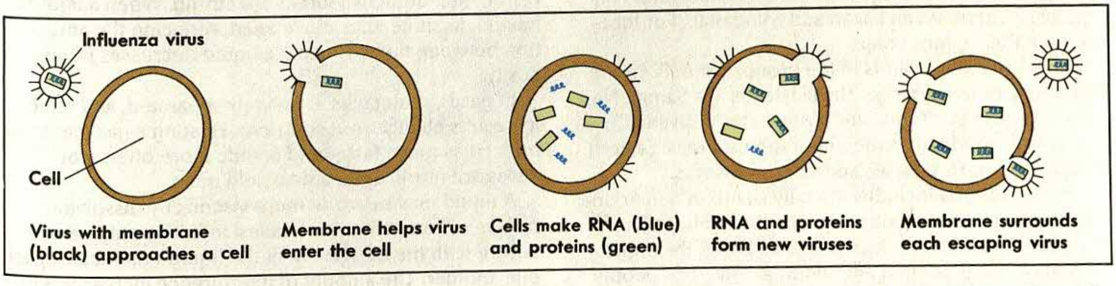
CNRI/Science Photo Library

Viruses have two basic shapes. Some, such as tobacco viruses, look like rods. Others, such as polio viruses, resemble spheres. A bacteriophage is a virus with a tail.

Viruses that attack bacteria are called *bacteriophages.* The word *bacteriophage* means *bacteria eater.* Bacteria, like plants, have tough cell walls. To penetrate these walls, most bacteriophages have a structure that works like a hypodermic needle. This structure consists of a sphere-shaped head that contains a nucleic acid, and a hollow, rod-shaped tail made of protein. When a bacteriophage enters a bacterium, the tail first penetrates the cell wall. Then the nucleic acid in the head of the bacteriophage moves through the tail and into the cell of the bacterium.

How viruses are used. Virologists study viruses chiefly to learn how they cause disease and how to control these organisms. Scientists also use viruses for such purposes as (1) insect control, (2) cell research, and (3) development of vaccines and other drugs.

Insect control. Certain viruses cause fatal diseases in


Influenza virus
Cell
Virus with membrane (black) approaches a cell
Membrane helps virus enter the cell
Cells make RNA (blue) and proteins (green)
RNA and proteins form new viruses
Membrane surrounds each escaping virus

Viruses reproduce rapidly inside cells. An influenza virus multiplies almost immediately after infecting a cell, *above.* Such rapid reproduction by a virus can lead to disease. Newly formed viruses escape from a cell and infect other cells before the body can stop the process.

insects. Virologists are seeking ways to use these viruses to kill insects that damage crops. The use of such viruses may one day replace insecticides, which kill insects but also may have harmful effects on plants as well as other animals.

Cell research. Viruses are such simple organisms that scientists can easily study them to gain more knowledge about life itself. Research on bacteriophages has helped biologists understand genes, DNA, and other basic cell structures. Future research may provide further knowledge of how cells function and reproduce.

Development of vaccines and other drugs. Scientists produce vaccines from either dead or live viruses. Those used in dead-virus vaccines are killed by chemicals and injected into the body. They cause the body to produce antibodies and other substances that resist viruses. For live-virus vaccines, virologists select very mild forms of living viruses that stimulate the body's immune system but cause no serious harm. In addition, scientists can genetically engineer bacteria to produce interferons that fight virus infections (see **Genetic engineering**). This technique, called *gene-splicing* or *recombinant DNA,* is also used to make new types of virus vaccines and drugs.

Related articles in *World Book* include:

Some virus diseases

AIDS
Canine parvovirus
Chickenpox
Cold, Common
Creutzfeldt-Jakob disease
Dengue
Distemper
Encephalitis
Foot-and-mouth disease
Hepatitis
Herpesvirus
Influenza
Kawasaki disease
Measles
Mosaic disease
Mumps
Poliomyelitis
Rabies
Shingles
Yellow fever

Other related articles

Bacteria
Disease (Infectious diseases)
Gnotobiotics
Immune system
Interferon
Rous, Francis
Salk, Jonas E.

Visa is an endorsement that government officials place on a passport to show the passport is valid (see **Passport**). Officials of the country a traveller is entering grant the visa. It certifies that the passport has been examined and approved. Immigration officers then permit the bearer to enter the country. A government that does not want a person to enter the country can refuse to grant that person a visa.

Visayan Islands is a group of islands in central Philippines, lying between Luzon and Mindanao. For location, see **Philippines** (map).

There are many islands in the group, but only six are of any size or importance. These islands are Samar, Negros, Panay, Leyte, Cebu, and Bohol. The Visayan Islands group is divided into three geographical areas: Eastern Visayas, Western Visayas, and Central Visayas.

Eastern Visayas includes the hilly island of Samar, the third largest in the country. Marcos Bridge links Samar and Leyte over the San Juanico Strait. Leyte, the eighth largest island, is rugged and mountainous. The people of the islands rely mainly on agriculture and fishing for their income. But frequent typhoons cause the Eastern Visayas to remain largely undeveloped.

Western Visayas includes two islands of importance. Panay has a well-developed central plain, which is heavily populated. To the southeast of the island stands Iloilo, the trading and commercial centre of Western Visayas. The island of Negros is the major producer and exporter of sugar in the Philippines. Other important products included *abacá* (Manila hemp), coconuts, maize, minerals, and timber.

Central Visayas includes the island of Bohol. Tourists are attracted by the hills known as *the chocolate hills,* which turn brown in summer. Cebu is a long island with a mountain range that extends throughout the province. Its capital, Cebu City, was founded in 1565 by the Spaniards. It became the first national capital of the Philippines.

See also **Bohol; Cebu; Cebu City; Iloilo.**

Viscacha is the name of four species of South American rodents. The *plains viscacha* lives on the *pampas* (grassland) and scrubland of Argentina. The plains viscacha has a large, blunt head, with a distinct broad, black stripe. The soft underfur is covered by long, coarse, dark-coloured guard hairs. A male plains viscacha is about 50 centimetres long, excluding the tail. It weighs about 10 kilograms and is twice as heavy as the female. Plains viscachas live in extensive burrow systems. They are considered pests because of their burrows, and because they compete with cattle for grass.

The three species of *mountain viscachas* live in the Andes Mountains, from Peru to Chile. They are rabbit-like with thick, soft fur, and generally have a dark stripe along the back. Mountain viscachas measure about 35 centimetres long and live in groups. They shelter in burrows and rock crevices, and feed on plants.

Scientific classification. Viscachas belong to the order Rodentia, family Chinchillidae. The plains viscacha is *Lagostomus maximus.* Mountain viscachas are genus *Lagidium.*

Viscosity is a measure of the resistance of a *fluid* (liquid or gas) to flow. Fluids with *high viscosity,* such as molasses, flow more slowly than those with *low viscosity,* such as water.

For a fluid to flow, the mobile molecules that make up the fluid must move past one another. Two actions oppose this movement, giving rise to viscosity: (1) Molecules collide with one another, and (2) molecules are drawn toward one another by, for example, attractive forces between opposite electric charges that they carry.

Temperature affects the viscosity of both liquids and gases. The molecules of liquids are close together. As a result, their attractive forces are strong. When a liquid is heated, its molecules move apart, reducing the attraction between them. Heating a liquid decreases its viscosity.

In gases, molecules are widely separated, and viscosity results chiefly from collisions. Heating a gas makes its molecules move faster and collide more often. Hot gases are more viscous than cold ones.

A liquid may be made more viscous by dissolving *polymers* (long-chain molecules) in it. The polymers interfere with the movement of the liquid's molecules past one another. The amount of interference increases with temperature. Polymers are added to motor vehicle lubrication oils to ensure that the oil will not be too thin when the engine is hot.

Viscount is a title held by certain British noblemen. The title was the last of the five grades of *peers* (British noblemen) to be created. In the grading of the nobility, a viscount ranks below an earl and above a baron. John Beaumont, an officer and deputy to an earl, was the first to receive the title in 1440. It is usually given to men the ruler wishes to honour. See also **Nobility**.

Vishinsky, Andrei Yanuarievich (1883-1954), was a Russian prosecutor and diplomat. Vishinsky became a revolutionary in 1902, and he participated in an uprising in 1905.

Vishinsky joined the Communist Party in 1920. From 1933 to 1938, he was a ruthless prosecutor in the Communist Party purge trials. Vishinsky became a deputy commissar of foreign affairs in 1940. He served as foreign minister from 1949 to 1953. As the chief Soviet delegate in the United Nations, he became notorious for speeches against the Western world. He was born in Odessa.

Vishnu is one of the two main gods of Hinduism. The other is Shiva. Vishnu has a kindly nature, and Hindus call him *the Preserver.* They believe he tries to ensure the welfare of humanity.

Vishnu sometimes descends from heaven to the earth in one of his *avatars* (physical forms). He does so when a catastrophe faces the universe or if humanity needs comfort and guidance. According to Hindu belief, Vishnu has already appeared in nine principal avatars. The two most important ones were as the Indian prince Rama and the god Krishna. As Rama, Vishnu was the hero of the *Ramayana,* a Hindu epic. As Krishna, Vishnu took part in the *Bhagavad-Gita,* a philosophical dialogue that forms part of the *Mahabharata,* another epic. Hindus believe that Vishnu will return to the earth one day to destroy all evil and begin a new Golden Age of humanity.

See also **Ramayana; Bhagavad-Gita; Gupta dynasty** (picture); **Hinduism** (Divinities); **Mythology** (Hindu mythology).

The viscosity of liquids causes them to resist flowing. A liquid with low viscosity, *left,* flows much faster than a liquid that has high viscosity, *right.*

Stone statue (A.D. 900's to 1100's) by an unknown Indian sculptor; the Art Institute of Chicago

Vishnu is an important Hindu god. Hindus believe that one day he will descend from heaven to earth and destroy all evil.

Visigoths. See **Goths.**

Vision. See **Eye.**

Vistula River is an important waterway of east central Europe. It carries much of the river traffic in Poland. The Vistula rises in the Carpathian Mountains in southern Poland, and then takes a circular course northward. The river runs through the city of Warsaw. It empties by several branches into the Baltic Sea. Gdańsk lies at the mouth of the Nogat, the westernmost branch. See **Poland** (terrain map).

Light boats sail up the river as far as Kraków. The Vistula is frozen for two to three months of the year.

Canals connect the Vistula River with the Oder, the Dnepr, and the Neman, all navigable rivers. The Vistula is 1,091 kilometres long and drains an area of about 192,000 square kilometres.

Visual acuity. See **Eye** (Receiving regular eye examinations).

Vital statistics are a record of the most basic human events, including birth, marriage, divorce, sickness, and death. They indicate some of the changes occurring in the population of a country, state or province, or local community.

Vital statistics are gathered from birth and death certificates, marriage licences and divorce records, disease reports, and other official records. Government officials collect reports of the individual events, tabulate and analyse them, and publish vital statistics reports.

Using vital statistics. Business people, government workers, social scientists, and others use vital statistics for many purposes. Total numbers of births, marriages, divorces, illnesses of a specific type, and deaths that occur during a period of time are useful statistics. For example, the total number of deaths in a country in a given year may be subtracted from the total number of live births to obtain the natural increase of population during that year. In addition, public health agencies study the number of cases of certain diseases to plan immunization campaigns.

The rate at which events happen is often more informative than the total number of events. A *crude rate* is the number of events happening during a period of time, measured in proportion to the size of the total population. For example, the crude birth rate in the United States in 1985 was about 16 births for every 1,000 people. The rate was about 15 in Canada, 55 in Kenya, and 10 in West Germany.

Another kind of rate, called a *specific rate,* relates the number of events to a certain part of the population. *Age-specific* death rates—that is, rates based on deaths occurring in different age groups—are useful for comparing death rates in populations with different age compositions. For example, Mexico has a greater proportion of young people than the United States. In Mexico, the crude death rate in 1985 was 7 per 1,000. In the United States, it was 9 per 1,000. The crude rates make it appear as though life expectancy is greater in Mexico than in the United States. However, all of the age-specific death rates were lower in the United States. These rates show that, in reality, life expectancy is greater in the United States.

Statisticians often combine information from vital statistics and other sources to come up with specific rates. For example, they may use death certificates, census data, and special sample surveys to determine the specific rate for lung cancer deaths among white female cigarette smokers between the ages of 45 and 64. This rate could be compared with the corresponding rate for nonsmokers.

Local school planners may be interested in the number of births recorded in their own school district. They may then combine this number with information on the migration to their area of families with young children. These statistics enable the planners to estimate how many children will enrol in their schools in future years.

Collecting and publishing vital statistics. In many countries, laws regulate registration of most vital events. Doctors or hospital attendants file birth certificates with local *registrars* (official recorders). Doctors or coroners return death certificates to funeral directors, who file them with local registrars. The local registrars send birth and death certificates to a county or state registrar. After a marriage ceremony, the presiding official sends the record certifying the marriage to the licence clerk. The licensing office then sends the record to the registrar. Lawyers file divorce records with the clerk of the court that grants the divorce. The court clerk reports the divorce to the state registrar. Doctors must report certain diseases to local health departments.

Vital statistics are tabulated at local and national levels. The statistics are then tabulated and published at the national level.

See also **Birth and death rates; Census; Divorce; Marriage; Population.**

Vitamin is a chemical compound that the human body needs in small amounts. Vitamins make up one of the major groups of *nutrients* (food substances necessary for growth and health). Vitamins regulate chemical reactions by which the body converts food into energy and living tissues. There are 13 vitamins. Five of them are produced in the body itself. These vitamins are biotin, niacin, pantothenic acid, vitamin D, and vitamin K. Only biotin, pantothenic acid, and vitamin K, which are made by bacteria in the human intestine, are possibly produced in sufficient quantities to meet the body's needs. Therefore, vitamins must be supplied in a person's daily diet.

Each vitamin has such specific uses that one of the compounds cannot replace, or act for, another. But the lack of one vitamin can interfere with the function of another. The continued lack of one vitamin in an otherwise complete diet results in a *vitamin deficiency disease.* Such diseases include beriberi, pellagra, rickets, or scurvy. Investigators first discovered vitamins while searching for the causes of such diseases. In order to be considered a vitamin, a substance must be required in the diet to prevent a deficiency disease.

The best way for a healthy individual to obtain vitamins is to eat a balanced diet. A daily diet that includes a variety of foods from each of the basic food groups provides an adequate supply of all the vitamins (see **Nutrition** [Basic food groups]).

Some people take daily vitamin supplements, mostly in the form of vitamin tablets. Most supplements contain doses of one or more vitamins. The vitamins in such preparations are equivalent to those in food. But a person who eats a balanced diet has no need for daily supplements.

A person with a vitamin deficiency disease may be helped by taking one or more preparations that contain large doses of a certain vitamin or of a combination of several vitamins. Such preparations are widely available. But individuals should use them only if they are prescribed by a doctor.

Kinds of vitamins

The 13 vitamins are vitamins A; B complex, which is actually a group of 8 vitamins; and C, D, E, and K. Scientists divide vitamins into two general groups, *fat-soluble vitamins* and *water-soluble vitamins.* The fat-soluble vitamins—vitamins A, D, E, and K—dissolve in fats. The water-soluble vitamins—the B-complex vitamins and vitamin C—dissolve in water.

Vitamin A, also called *retinol,* occurs naturally only in animals. Egg yolk, liver, and milk provide much vitamin A. Some plants contain substances called *carotenes,* which the body converts into vitamin A. These plants include cabbage, carrots, and lettuce.

Vitamin A is essential for the development of babies before birth and the growth of children. It is especially needed for the growth of bones and teeth. Vitamin A keeps the skin healthy and helps produce mucous secretions that build resistance to infection. People who do not get enough vitamin A may develop a condition called *xerophthalmia,* in which the surface of the eye becomes dry and likely to develop infection. Vitamin A also forms part of the two pigments that help the eyes to function normally in light that varies in intensity. Night blindness is an early symptom of a deficiency of vitamin A.

Vitamin B complex was first believed to be only one vitamin. Researchers later discovered that it consists of eight vitamins—thiamine, riboflavin, niacin, B_6, pantothenic acid, biotin, B_{12}, and folic acid.

Thiamine, or *vitamin B_1,* prevents and cures beriberi, a disease of the nervous system (see **Beriberi**). The vitamin contains sulphur and nitrogen. Sources of thiamine include green vegetables; meat, especially pork; nuts; soybeans; yeast; and whole-grain and enriched breads and cereals. This vitamin, like vitamin A, is needed for growth. The body also needs it to change carbohydrates into energy.

Riboflavin, or *vitamin B_2,* is most abundant in such foods as eggs, fish, liver, milk, poultry, yeast, and green and leafy vegetables. Direct sunlight destroys riboflavin in milk. This vitamin is needed for growth and for healthy skin and eyes. It promotes the body's use of oxygen in converting food into energy. If a person does not get enough riboflavin, cracks may develop in the skin at the corners of the mouth. The person also may have inflamed lips and a sore tongue, and scaly skin around the nose and ears. The eyes may become extremely sensitive to light.

Niacin, or *nicotinic acid,* helps prevent pellagra (see **Pellagra**). The best sources of niacin are fish, green vegetables, lean meat, poultry, and whole-grain and enriched bread and cereal. Milk and eggs, even though they have little niacin, are good pellagra-preventive foods because they contain *tryptophane,* an amino acid (see **Amino acid**). The body converts some tryptophane into niacin.

Niacin is essential for growth, for healthy tissues, and for the conversion of carbohydrates into energy. It also helps produce fats in the body (see **Fat**). Without niacin, thiamine and riboflavin cannot function properly. Lack of niacin may cause ailments of the skin and of the digestive and nervous systems.

***Vitamin B_6*, pantothenic acid, and biotin.** A deficiency of these vitamins has never been reported in people who have a healthy diet. Vitamin B_6, or *pyridoxine,* helps the body use amino acids, which are the building blocks of proteins. Lack of this vitamin damages the skin and nervous system. Pantothenic acid is converted by the body into *coenzyme A,* a vital substance that helps the body produce energy from food. Biotin helps the body change fats into fatty acids, which also aid in producing energy.

***Vitamin B_{12}* and folic acid.** Vitamin B_{12}, or *cyanocobalamin,* contains cobalt and is essential for the normal functioning of folic acid, also called *folacin.* Vitamin B_{12} and folic acid are needed to produce *deoxyribonucleic acid* (DNA) in the body's cells. DNA carries the "master plans" that govern each cell's activities (see **Cell**). A deficiency of either of these vitamins produces *anaemia,* a condition in which the blood has insufficient red blood cells (see **Anaemia**). Doctors may advise a pregnant woman to supplement her diet with folate to prevent anaemia. Doctors inject minute amounts of vitamin B_{12} to treat persons with *pernicious anaemia.* Lack of vitamin B_{12} also damages the nervous system.

Eggs, liver, milk, and other animal sources of proteins, as well as some microbes, supply vitamin B_{12}. People who eat only vegetables may lack this vitamin. Almost all uncooked foods contain folic acid, but cooking destroys varying amounts of it.

Vitamin C, or *ascorbic acid.* Doctors call vitamin C the *antiscorbutic vitamin* because it prevents and cures scurvy (see **Scurvy**). The body stores little vitamin C, and so this vitamin must be supplied daily in the diet. Good sources of it include citrus fruit, raw cabbage, strawberries, and tomatoes.

Vitamin C is essential for healthy blood vessels, bones, and teeth. People who lack this vitamin may have sore gums and suffer bleeding under the skin. Vitamin C also helps form *collagen,* a protein that holds tissues together.

Vitamin D helps prevent rickets, a bone disease (see **Rickets**). Either a deficiency or an excess of this vitamin can seriously affect the bones. There are several forms of vitamin D. One form, *calciferol,* or *vitamin D_2,* is produced in plants. It is produced from a *sterol,* a type of chemical compound, when a plant is exposed to ultraviolet light. Another form, *cholecalciferol,* or *vitamin D_3,* occurs in the tissues of animals, including human beings.

Vitamin D has been called the "sunshine vitamin" because it forms in the skin when the body is exposed to sunlight. Liver and fish oils contain much vitamin D_3. These oils may be used to enrich milk and other animal food products.

Vitamin E, or *tocopherol,* helps prevent polyunsaturated fatty acids from *oxidizing* (combining with oxygen). Vitamin E thus plays an important role in maintaining cell membranes, which contain substantial amounts of polyunsaturated fatty acids. The best sources of vitamin E are lettuce and wheatgerm oil. Meat, milk, eggs, liver, whole-grain cereals, and most vegetables also contain this vitamin. A deficiency of vitamin E occurs rarely and produces few symptoms.

Vitamin K is essential for blood clotting. Green leafy vegetables, such as cabbage, cauliflower, kale, and spinach, are rich in Vitamin K. Pork liver is also an excellent source. Intestinal bacteria manufacture vitamin K in the body, and so deficiencies of this vitamin rarely result from a poor diet. Doctors sometimes give women vitamin K before childbirth to prevent bleeding in the newborn baby. Babies do not have enough intestinal bacteria to produce adequate amounts of the vitamin until they are about 2 weeks old.

How vitamins work

Vitamins function as *catalysts* in the body. A catalyst is a substance that increases the speed of a chemical reaction without being consumed by the reaction. Vitamins help accelerate certain chemical reactions that occur in the body and are essential for health. Without vitamins, these reactions would occur very slowly or not at all.

Most vitamins play the role of either enzymes or organic compounds called *coenzymes* (see **Enzyme**). Enzymes are catalysts that contain protein and regulate certain body processes. An enzyme alters molecules in the body and combines with them to cause a chemical reaction. The enzyme is unchanged by the reaction, and it can repeat the process again and again.

Vitamins essential for human health

Vitamin	What it does	Sources
A (retinol)	Helps maintain skin, eyes, urinary tract, and lining of the nervous, respiratory, and digestive systems. Needed for healthy bones and teeth.	Sweet potatoes, milk, liver, fish liver oils, eggs, butter, green and yellow vegetables.
Thiamine (B_1)	Needed for carbohydrate metabolism and release of energy from food. Helps heart and nervous system function properly.	Yeast, meat, whole-grain and enriched breads and cereals, nuts, peas, potatoes, most vegetables.
Riboflavin (B_2)	Helps body cells use oxygen. Promotes tissue repair and healthy skin.	Milk, cheese, liver, fish, poultry, green vegetables.
Niacin (nicotinic acid)	Essential for cell metabolism and absorption of carbohydrates. Helps maintain healthy skin.	Liver, yeast, lean meat, whole-grain and enriched breads and cereals.
B_6 (pyridoxine)	Needed for healthy teeth and gums, blood vessels, nervous system, and red blood cells.	Yeast, whole-grain cereals, meat, poultry, fish, most vegetables.
Pantothenic acid	Helps the body convert carbohydrates, fats, and proteins into energy.	Egg yolk, meat, nuts, whole-grain cereals.
B_{12} (cyanocobalamin)	Essential for proper development of red blood cells. Helps proper function of nervous system.	Eggs, meat, milk, dairy products.
Biotin	Needed for healthy circulatory system and for maintaining healthy skin.	Egg yolk, nuts, liver, kidney, most fresh vegetables; made by intestinal bacteria.
Folic acid	Needed for production of red blood cells.	Green leafy vegetables, yeast, meat, poultry, fish.
C (ascorbic acid)	Essential for sound bones and teeth. Needed for tissue metabolism and wound healing.	Citrus fruit, tomatoes, raw cabbage, potatoes, strawberries
D (cholecalciferol)	Essential for calcium and phosphorus metabolism.	Fish liver oils, fortified milk, eggs, tuna, salmon, sunlight.
E (tocopherol)	Helps prevent the oxidation of polyunsaturated fatty acids in cell membranes and other body structures.	Whole-grain cereals, lettuce, vegetable oils.
K	Needed for normal blood clotting.	Leafy vegetables; made by intestinal bacteria.

Some vitamins occur in inactive forms that do not influence chemical reactions. The body converts such vitamins into their active forms. Vitamin D is unique because it functions not only as a vitamin, but also as a "chemical messenger," or *hormone* (see **Hormone**).

History

Such nutritional diseases as beriberi, pellagra, rickets, and scurvy have been known for centuries. But the idea that they might result from a dietary deficiency is comparatively new. One of the first persons to study the effect of diet on human health was James Lind, a Scottish doctor. As early as the 1740's, Lind used lemons and oranges to cure scurvy in sailors, who rarely ate fresh fruit on long voyages. In 1882, a Japanese doctor named Kanehiro Takaki cured beriberi among naval crews by adding meat and vegetables to their diet of rice.

Christiaan Eijkman, a Dutch scientist, studied beriberi in the Dutch East Indies (now Indonesia). About 1900, he showed that people who ate *polished rice* (rice with the husks and bran layers removed) developed the disease, whereas those who ate unpolished rice did not. Eijkman concluded that the husks and bran layers of the rice contained an *antiberiberi factor* that was essential for health.

In 1912, a Polish biochemist, Casimir Funk, tried but failed to extract the pure antiberiberi factor from rice polishings. Funk thought the substance belonged to a group of chemical compounds called *amines,* and he named it *vitamine,* meaning *amine essential to life.* Meanwhile, research on the effect of diet on the growth of rats was published in 1906 by the British biochemist Frederick Hopkins. He demonstrated that certain foods contain substances that are vital for the growth and development of the body. Hopkins called these substances "accessory food factors," to distinguish them from the well-established "basic food factors"—carbohydrates, fats, proteins, minerals, and water. Later, the word *vitamin* (with the *e* dropped) came to be used for all such accessory substances. Together, Hopkins and Funk developed the vitamin theory of deficiency disease.

At first, scientists thought there were only two vitamins, a fat-soluble one and a water-soluble one. By 1922 the American biochemist Elmer McCollum had proved that the fat-soluble vitamin actually consisted of a mixture of vitamins. About the same time, Joseph Goldberger, an American doctor, showed that the water-soluble vitamin was also a mixture. Since then, vitamins of both types have been identified. Although it is possible that more may be discovered, none of the compounds proposed as vitamins since 1948, when vitamin B_{12} was isolated, has met the required scientific qualifications.

Related articles in ***World Book*** include:

Diet
Goldberger, Joseph
Nutrition

Vitreous humour. See Eye (Parts of the eye; diagram).

Vivaldi, Antonio (1678-1741), was an Italian composer. He was one of the most productive composers in the *baroque* style, which was marked by regular rhythm and elaborate melody.

Vivaldi helped develop the baroque concerto, which influenced the German composer Johann Sebastian Bach and the early symphony composers. Bach admired Vivaldi's concertos and arranged 10 of these works for the harpsichord and the organ.

Vivaldi was an accomplished violinist and composed his most important works for the violin. Four violin concertos known as *The Four Seasons* (1725) are his best-known compositions. They are an important example of *programme music*—that is, music that tells a story or depicts a landscape. Vivaldi also composed operas, cantatas, oratorios, and solo and trio sonatas. His best-known sacred choral composition is the *Gloria in D Major* (1708).

Vivaldi was born in Venice. He was ordained a priest in 1703 but devoted his life to music. In 1703, he became a violin teacher at the Venetian Ospedale della Pietà, a girls' orphanage with an excellent chorus and orchestra. He composed many of his works for the orphanage musicians, writing concertos for almost every instrument known in Europe at the time.

Vivekananda (1863-1902) was an Indian philosopher and social reformer. He was born in Calcutta and educated at a Christian college. His early education familiarized him with the Western philosophy that he later used to interpret Hinduism. Vivekananda's original name was *Narendranath Datta.* He received his new name and the title *swami* (master) after accepting the teachings of Ramakrishna (see **Ramakrishna**).

Vivekananda believed in the oneness of all creation in God. He devoted his life to working for social reform. He opposed what he regarded as abuses, such as *caste* (class) discrimination, child marriage, and the lowly status of women in society. He encouraged care for the sick and the poor, and supported education for all. In 1893, Vivekananda represented Hinduism at the World Parliament of Religions in Chicago. His impressive presentation won him an international reputation.

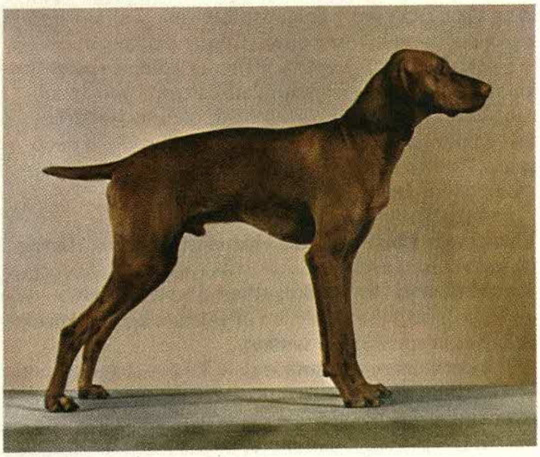
Viviparous animal is an animal that reproduces by means of eggs that are fertilized and develop inside the mother's body. The offspring of viviparous animals look like the adult animals but are smaller. Most types of mammals, many reptiles, and some fish are viviparous. In *oviparous* animals, fertilized eggs develop outside of the mother's body.

Vivisection. See **Animal experimentation.**

Vixen. See **Fox** (Young).

Vizier is the title some Muslim countries give to certain high officials, such as ministers of state. The word *vizier* comes from the Arabic word *wazir,* which means a *bearer of burdens.* In the Ottoman Empire, viziers were the chief advisers and deputies of the *sultan* (ruler). In the 1800's, heads of Ottoman government departments were called viziers. The government's top administrator was often called the Grand Vizier.

Vizsla is a short-haired hunting dog also known as the *Hungarian pointer.* Vizslas resemble other short-haired pointing breeds except that they have deep, rusty-gold coats. The adult Vizsla weighs between 22 and 28 kilograms. It stands from 53 to 62 centimetres high at the shoulder and has a *docked* (shortened) tail.



The Vizsla is a powerful hunting dog.

Dog experts believe the breed is descended from dogs that were brought into central Europe by the Magyars about 1,000 years ago (see **Magyars**). Central Europeans first used the dogs to hunt with falcons.

Vladimir I (956?-1015), was a Grand Prince of Kiev, in what is now Ukraine. He also ruled Novgorod, in present-day Russia. As ruler of these cities, he built up the powerful state of Kievan Rus, which extended from the Baltic Sea to near the Black Sea. In Ukrainian, his name is spelled *Volodymyr.*

Vladimir was probably born in or near Kiev. He became prince of Novgorod about 969 and Grand Prince of Kiev and All Rus in 980. He married Anna, sister of the Byzantine Emperor Basil II, and replaced paganism in Kievan Rus with Christianity. Under Vladimir and Anna, Kiev became famous for its rich cultural life. Agriculture and trade flourished, important towns developed, and churches were built. Vladimir is recognized as a saint by all Catholic and Orthodox churches.

Vladivostok (pop. 590,000) is the most important Russian port on the Pacific Ocean. It is located in southeastern Siberia, near the Korean border. For location, see **Russia** (political map).

Vladivostok's fine harbour, formed by the Bay of the Golden Horn, has an area of about 5 square kilometres. The harbour is usually frozen between January and March, but icebreakers keep it open. Vladivostok is a base for fishing fleets. The city has shipyards and fish canneries. It also produces mining equipment. Vladivostok lies near the east end of the railway line that crosses Siberia (see **Trans-Siberian railway**).

Russians founded Vladivostok in 1860. The city became a naval base after Russia lost Lüshun (also called Port Arthur) to Japan in 1905.

Vlaminck, Maurice de (1876-1958), was a French artist. With André Derain and Henri Matisse, he was a leader of the fauvist movement in the early 1900's. Vlaminck was influenced by the paintings of the Dutch artist Vincent van Gogh. Like van Gogh, he used slashing brushstrokes and brilliant colours to increase the dramatic impact of his work. However, the exuberant quality of Vlaminck's work contrasted sharply with the feeling of suffering in many of van Gogh's paintings.

From about 1908 to 1914, Vlaminck painted under the influence of the French artist Paul Cézanne and of cubism. About 1915, he began painting gloomy landscapes that emphasized dark colours and the illusion of deep space. He also created etchings and lithographs in this style. He was born in Paris.

See also **Fauves.**

Vlamingh Plate. See **De Vlamingh, William; Hartog, Dirk.**

Vocabulary is the total number of words in a language. It is also the collection of words a person knows and uses in speaking or writing.

The vocabulary of a language is always changing and growing. As life becomes more complex, people devise or borrow new words to describe human activity. No one knows the exact number of English words today, but reliable estimates are that there are probably about 1 million.

A person has two kinds of vocabularies. The *active* or *use* vocabulary is made up of words used in speaking or writing. The *passive* or *recognition* vocabulary consists of words a person understands when listening or reading. Many people have a recognition vocabulary several times larger than their use vocabulary. This means that they understand words they hear or read but these may be words that they do not habitually use in speaking or writing. For English speakers, the average use vocabulary is 10,000 words, but the average recognition vocabulary is 30,000 to 40,000 words.

A person continually builds a vocabulary. Studies have shown that a child entering school may know only from 3,000 to 4,000 words. But by the completion of university, he or she may have a vocabulary of from 10,000 to 30,000 words.

The range of a person's vocabulary is a clue to the person's culture and education. Control over words is often the same as control over the ideas the words represent. The dictionary is an important tool for increasing your vocabulary. If you encounter a word you do not know, look it up and find out what it means and how it is used.

See also **Dictionary; Reading; Shakespeare, William** (Vocabulary).

Vocal cord. See **Larynx; Voice.**

Vodka. See **Alcoholic beverage** (Vodka).

Vogelweide, Walther von der. See **Walther von der Vogelweide.**

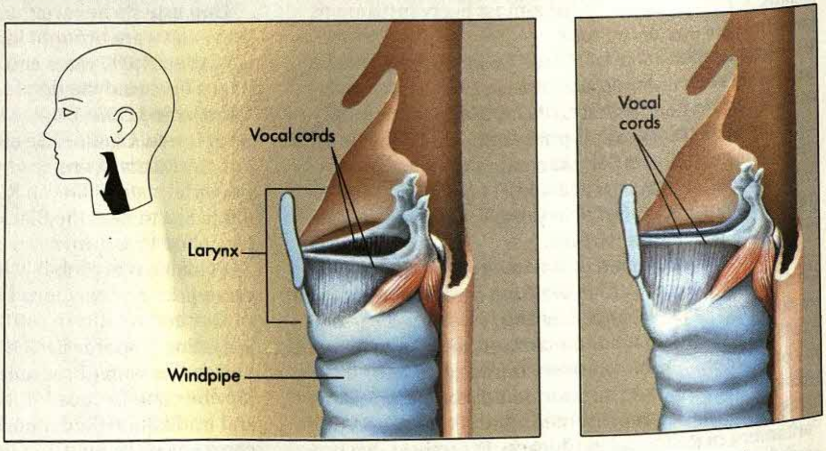
Voice. Almost all animals have voices. A few animals, like the giraffe, rarely use their voices. But most higher animals can bark, cry, howl, groan, growl, chirp, or make some other noise. Many of the animals use their voices to communicate with each other. Birds can make music with their voices. Dogs can express several feelings with their voices. They whimper when begging or when they feel guilty, they growl when angry, and bark eagerly when they are happy.

Several of the zoo animals, such as the chimpanzee, also make various sounds to show different feelings. But no animal's voice is as highly developed as a human being's voice.

The human voice can express ideas through a variety of arrangements of consonant and vowel sounds. It can also be used for singing. It can combine speech with music, and sing words. Because the human voice is so highly developed, people have been able to create elaborate languages. These languages allow people to

How the vocal cords produce sounds

In human beings, sounds of the voice are made chiefly by the *vocal cords,* small bands of tissue that stretch across the larynx. Muscles in the larynx stretch and relax the vocal cords on each side of an opening in the trachea. When we speak, the larynx muscles pull on the cords, narrowing the opening. Air forced from the lungs vibrates the tensed cords, producing sound.



Relaxed vocal cords for breathing

Tensed vocal cords

tell one another their most detailed thoughts and actions.

The vocal cords are the main sound producers in human beings. These two small folds of tissue stretch across the *larynx* (voice box). One fold stretches on each side of the windpipe opening. Muscles in the larynx stretch and relax the vocal cords.

When we breathe, we relax our vocal cords so they form a V-shaped opening that lets air through. When we speak, we pull the vocal cords by the attached muscles, narrowing the opening. Then, as we drive air from the lungs through the larynx, the air vibrates the tightened vocal cords and sound results.

Varying the sound. The voice mechanism is so well organized that we use our vocal cords, muscles, and lungs in many combinations without thinking about it. The more tightly the vocal cords are stretched, the higher are the sounds produced. The more relaxed the cords, the lower the sounds. Even in normal speech we stretch and relax the vocal cords to many degrees. This stretching and relaxing produces variations in the sounds of our voice.

The pitch of the voice is determined by the size of the larynx. Women's voices are usually pitched higher than men's because their vocal cords are shorter. Boys and girls have vocal cords of about the same size until the boys reach puberty. At puberty, the voice boxes of the boys grow larger. As a result, the boys' voices become lower.

The tongue, lips, and teeth also help shape the sounds of the voice. In addition, the nasal cavity gives resonance and colour to the voice. When a person becomes ill with a cold and the nasal passages are blocked, the person's voice changes.

Straining the voice affects the vocal cords. So does a general muscular tension caused by nervousness. In the disease called *laryngitis* the larynx is inflamed, irritated, or infected. Sometimes the sick person cannot speak at all for a day or two.

Related articles in ***World Book*** include:

Laryngitis
Larynx
Singing
Stuttering
Voiceprint
Windpipe

Voice, in grammar, is a feature of verbs. It tells whether the subject of the verb acts or is acted upon. English has two voices, *active* and *passive.*

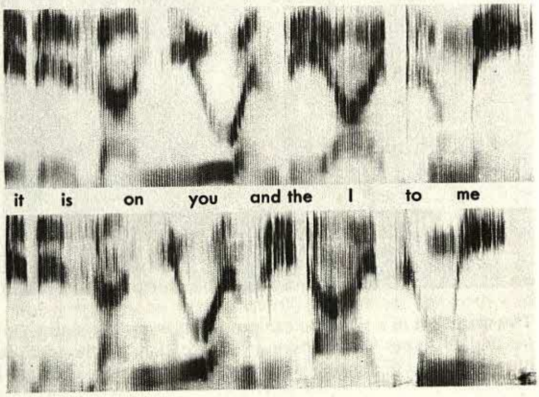
A verb is in the active voice when its subject is the doer of the action. For example, the verb is in the active voice in the sentence *John sees the picture,* because the subject *(John)* performs the action *(sees).*

A verb is in the passive voice when its subject receives the action. For example, in the sentence *The picture was seen by John,* the subject *(picture)* receives the action *(was seen).* The verb is therefore passive. In English, the passive voice consists of some form of the verb *be* (such as *is, was, were,* or *been*), plus the past participle (such as *seen*). Passive forms of *see* include *is seen, was seen, were seen, will be seen, have been seen, is being seen,* and *was being seen.* Only *transitive verbs* (verbs that take a direct object) can be changed to passive voice.

See also **Conjugation; Verb.**

Voiceprint, also called *speech spectrogram,* is a visual record of the sound waves of a human voice. Voiceprints and tape recordings of the voices of several people are sometimes compared to identify a certain person's voice. However, some scientists question the reliability of this method as a means of identification. Voiceprints are also used in the study of speech and hearing disorders.

Some police departments in the United States use voiceprint evidence in criminal cases. They believe the voiceprint method is reliable as a method of identification when used in combination with tape recordings. Voiceprints often have been used to help acquit people who have been suspected of such crimes as extortion and the making of obscene telephone calls. Voiceprint evidence has been admitted in many criminal cases in the U.S.A. But some experts believe voiceprints are difficult to interpret and are not accurate enough for use in court. In many other countries, courts very rarely accept voiceprint evidence.



Voiceprints, like fingerprints, can be used as a means of identification. The two voiceprints shown above were made by the same person's saying the same words at different times.

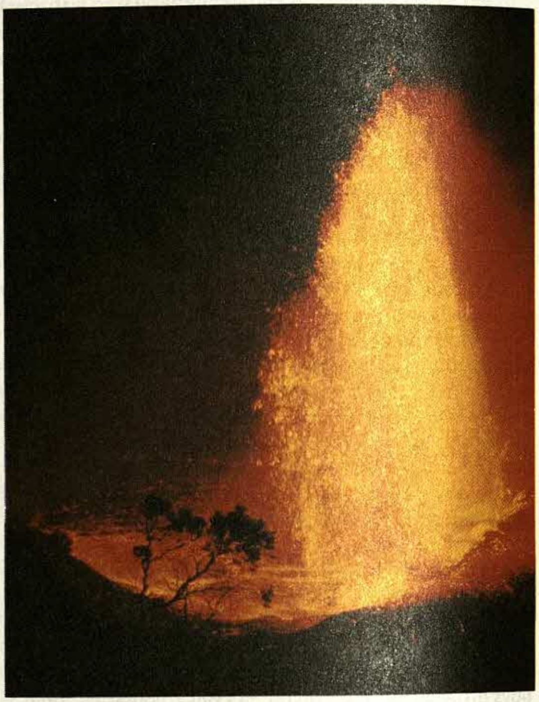
Voiceprints are made by running a tape recording of a voice through an instrument called a *sound spectrograph.* A voiceprint shows the duration of spoken words and the loudness, pitch, and quality of the recorded voice.

Three American scientists first developed the sound spectrograph in the 1940's. The American physicist Lawrence G. Kersta and the American audiologist Oscar I. Tosi later contributed to the development of voiceprints as a means of identification.

Voile is a thin, open cloth made of silk, cotton, polyester, rayon, or nylon. It gets its name from the French word *voiler,* which means *to veil.* Voile has a plain weave. Voiles are used in making dresses, curtains, and trimmings.

Vojvodina. See **Serbia.**

Volapük was the first widely used universal language. The name of the language comes from two of its words meaning *world* and *speak.* Johann Martin Schleyer, a German priest, created the language in 1879. By 1889, approximately 200,000 people were using Volapük, but few people use the language today. Volapük combined elements from English, German, Latin, and Romance languages such as French and Italian.



The eruption of a volcano can produce spectacular sights. On the left, great clouds of dense gas and dust pour from Surtsey, a volcanic island off the south coast of Iceland. On the right, enormous fountains of glowing lava shoot out of the volcano Kilauea in Hawaii.

Volcano

Volcano is an opening in the earth's surface through which lava, hot gases, and rock fragments *erupt* (burst forth). Such an opening forms when melted rock from deep within the earth blasts through the surface. Most volcanoes are mountains, particularly cone-shaped ones, which were built up around the opening by lava and other materials thrown out during volcanic eruptions.

Eruptions of volcanic mountains are spectacular sights. In some eruptions, huge fiery clouds rise over the mountain, and glowing rivers of lava flow down its sides. In other eruptions, red-hot ash and cinders shoot out of the mountaintop, and large chunks of hot rock are blasted high into the air. A few eruptions are so violent that they blow the mountain apart.

Some eruptions occur on volcanic islands. Such islands are the tops of volcanic mountains that have been built up from the ocean floor by repeated eruptions. Other eruptions occur along narrow cracks in the ocean floor. In such eruptions, lava flows away from the cracks, building up the sea bottom.

People have always been both fascinated by the spectacle of volcanic eruptions and terrified of their power. Eruptions have caused some of the worst disasters in history, wiping out entire towns and killing thousands of people. In early times, volcanoes played a role in the religious life of some peoples. The word *volcano,* for example, comes from *Vulcan,* the name the ancient Romans gave to their god of fire. The ancient Romans believed the god of fire lived beneath a volcanic island off the coast of what is now Italy. The Romans called the island *Vulcano.*

How a volcano is formed

Powerful forces within the earth cause volcanoes. Scientists do not fully understand these forces. But they have developed theories on how the forces create volcanoes. This section describes how most scientists explain the beginning and eruption of a volcano.

The beginning of a volcano. A volcano begins as *magma,* melted rock inside the earth. Magma results from the extreme heat of the earth's interior. At certain depths, the heat is so great it partly melts the rock inside the earth. When the rock melts, it produces much gas, which becomes mixed with the magma. Most magma forms 80 to 160 kilometres beneath the surface. Some develops at depths of 25 to 50 kilometres.

The gas-filled magma gradually rises toward the earth's surface because it is lighter than the solid rock around it. As the magma rises, it melts gaps in the surrounding rock. As more magma rises, it forms a large chamber as close as 3 kilometres to the surface. This *magma chamber* is the reservoir from which volcanic materials erupt.

The eruption of a volcano. The gas-filled magma in the reservoir is under great pressure from the weight of the solid rock around it. This pressure causes the magma to blast or melt a *conduit* (channel) in a fractured or weakened part of the rock. The magma moves up through the conduit to the surface. When the magma nears the surface, the gas in the magma is released. The gas and magma blast out an opening called the *central vent.* Most magma and other volcanic materials then erupt through this vent. The materials gradually pile up around the vent, forming a volcanic mountain, or volcano. After the eruption stops, a bowllike crater generally forms at the top of the volcano. The vent lies at the bottom of the crater.

Once a volcano has formed, not all the magma from later eruptions reaches the surface through the central vent. As the magma rises, some of it may break through the conduit wall and branch out into smaller channels. The magma in these channels may escape through a vent formed in the side of the volcano. Or it may remain below the surface.

Kinds of volcanic materials

Three basic kinds of materials may erupt from a volcano. They are (1) lava, (2) rock fragments, and (3) gas. The material that erupts depends chiefly on how sticky or fluid a volcano's magma is.

Lava is the name for magma that has escaped onto the earth's surface. When lava comes to the surface, it is red hot and may have a temperature of more than 1100° C. Highly fluid lava flows rapidly down a volcano's slopes. Sticky lava flows more slowly. As the lava cools, it hardens into many different formations. Highly fluid lava hardens into smooth, folded sheets of rock called *pahoehoe.* Stickier lava cools into rough, jagged sheets of rock called *aa.* Pahoehoe and aa cover large areas of Hawaii, where the terms originated. The stickiest lava forms flows of boulders and rubble called *block flows.* It may also form mounds of lava called *domes.*

Other lava formations include *spatter cones* and *lava tubes.* Spatter cones are steep hills up 30 metres high. They build up from the spatter of fountainlike eruptions of thick lava. Lava tubes are tunnels formed from fluid lava. As the lava flows, its outer surface cools and hardens. But the lava underneath continues to flow. After the flowing lava drains away, it leaves a tunnel.

Rock fragments, generally called *tephra,* are formed from sticky magma. Such magma is so sticky that its gas cannot easily escape when the magma approaches the surface or central vent. Finally, the trapped gas builds up so much pressure that it blasts the magma into fragments. Tephra includes, from smallest to largest, *volcanic dust, volcanic ash,* and *volcanic bombs.*

Volcanic dust consists of particles less than 0.25 millimetre in diameter. Volcanic dust can be carried great distances. In 1883, the eruption of Krakatoa in Indonesia shot dust 27 kilometres into the air. The dust was carried around the earth several times and produced brilliant red sunsets in many parts of the world. Some scientists believe that large quantities of volcanic dust can affect the climate by reducing the amount of sunlight that reaches the earth.

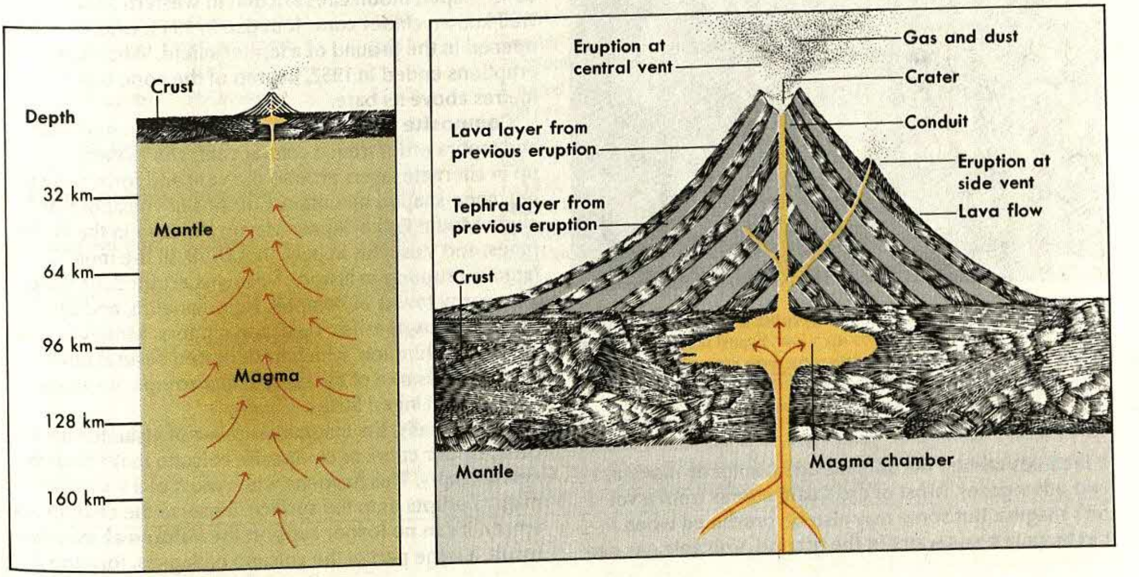
Volcanic ash is made up of fragments less than 0.5 centimetre in diameter. Most volcanic ash falls to the surface and becomes welded together as rock called *volcanic tuff.* Sometimes, volcanic ash combines with water in a stream and forms a boiling *mudflow.* Mudflows may reach speeds of 100 kilometres per hour and can be highly destructive.

Volcanic bombs are large fragments. Most of them range from the size of a rugby ball to that of a basketball. The largest bombs may measure more than 1 metre across and weigh up to 90 metric tons. Small volcanic bombs are generally called *cinders.*

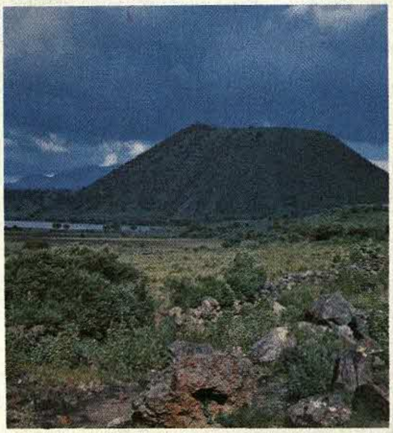
Gas pours out of volcanoes in large quantities during most eruptions. The gas is made up chiefly of steam. But

How a volcanic mountain erupts

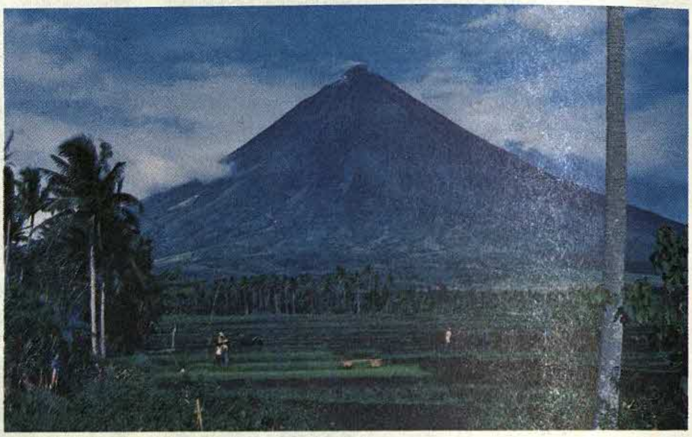
An eruption begins when *magma* (melted rock inside the earth) rises toward the surface, *left,* and collects in a *magma chamber* under the volcano. Pressure on the chamber forces the magma up through the *conduit, right.* In the *composite volcano* shown here, the magma erupts through the central and side vents as gas and mostly lava or mostly *tephra* (dust and other fragments).



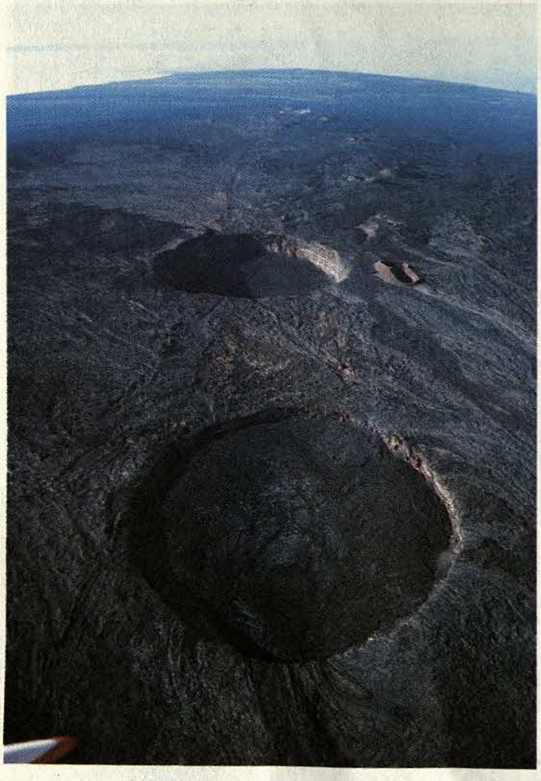
The three main kinds of volcanoes



Cinder cones, such as Mexico's Paricutín, *above,* form when mainly tephra erupts from the central vent and piles up around it.



Composite volcanoes are created by repeated eruptions of lava and tephra. The materials pile up in alternate layers, forming a cone-shaped mountain. Mayon Volcano in the Philippines, *above,* is one of the most perfectly shaped volcanoes.



A shield volcano forms when lava erupts from several vents, spreads out widely, and builds up a low, broad mountain. Most shield volcanoes have many craters on their summits. The larger craters are called *calderas.* Hawaii's Mauna Loa, *above,* was formed by thousands of layers of overlapping lava.

it includes carbon dioxide, nitrogen, sulphur dioxide, and other gases. Most of the steam comes from a volcano's magma. But some may also be produced when rising magma heats water in the ground. Volcanic gas carries a large amount of volcanic dust. This combination of gas and dust looks like black smoke.

Kinds of volcanoes

Scientists divide volcanoes into three main groups: (1) shield volcanoes, (2) cinder cones, and (3) composite volcanoes. These groups are based on the shape of the volcanoes and the type of material they are built of.

Shield volcanoes are formed when a large amount of free-flowing lava spills from a vent and spreads widely. The lava gradually builds up a low, broad, dome-shaped mountain. The famous Mauna Loa in Hawaii is a shield volcano. Thousands of separate, overlapping lava flows, each less than 15 metres thick, formed Mauna Loa.

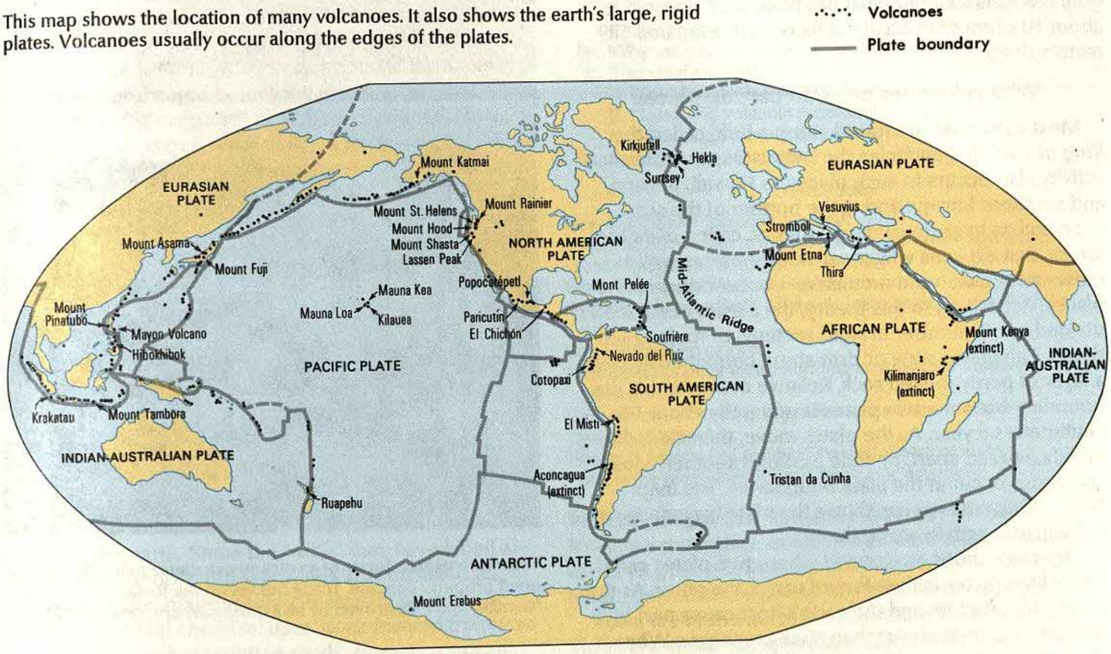
Cinder cones build up when mostly tephra erupts from a vent and falls back to earth around the vent. The accumulated tephra, which is generally cinders, forms a cone-shaped mountain. Paricutín in western Mexico is a well-known cinder cone. It began in 1943, when a crack opened in the ground of a farmer's field. When the eruptions ended in 1952, the top of the cone was 410 metres above its base.

Composite volcanoes are formed when both lava and tephra erupt from a central vent. The materials pile up in alternate layers around the vent and form a towering, cone-shaped mountain. Composite volcanoes include Mount Fuji in Japan; Mayon Volcano in the Philippines; and Vesuvius in Italy. In A.D. 79, in the most famous eruption in history, Vesuvius erupted, burying the nearby towns of Pompeii, Herculaneum, and Stabiae under a mass of ashes, dust, and cinders. Mount St. Helens, in Washington, which has erupted several times since 1980, is one of the most active composite volcanoes in the United States.

Occasionally, the magma chamber of a shield volcano, cinder cone, or composite volcano may become nearly empty. This happens when most of a volcano's magma erupts onto the surface. Because the chamber is empty, it can no longer support the volcano above. As a result, a large part of the volcano collapses, forming a

Where volcanoes occur

This map shows the location of many volcanoes. It also shows the earth's large, rigid plates. Volcanoes usually occur along the edges of the plates.



Some famous volcanoes

Name	Location	Height above sea level In metres	Interesting facts
***Aconcagua**	Argentina	6,959	Highest mountain in Western Hemisphere; volcano extinct.
***Cotopaxi**	Ecuador	5,897	Eruption in 1877 produced mudflow that travelled about 240 kilometres and killed about 1,000 people.
El Chichón	Mexico	1,060	Eruption in 1982 killed 187 people and released a cloud of dust and sulphur dioxide gas high into the atmosphere.
Hibokhibok	Philippines	1,330	In 1951, red-hot cloud of gas and dust killed about 500 people.
***Krakatau**	Indonesia	813	Great eruption in 1883 heard about 4,800 kilometres away; produced sea waves almost 40 metres high that drowned about 36,000 people.
***Mauna Loa**	Hawaii, U.S.A.	4,169	World's largest volcano; rises about 9,000 metres from ocean floor and is about 100 kilometres wide at its base.
***Mont Pelée**	Martinique	1,397	Glowing cloud from 1902 eruption destroyed town of St. Pierre, killing about 38,000 people in minutes.
***Mount Etna**	Sicily, Italy	3,390	About 20,000 people killed in 1669 eruption.
Mount Katmai	Alaska, U.S.A.	2,047	Eruption in 1912 produced glowing flood of hot ash that travelled about 25 kilometres and formed Valley of Ten Thousand Smokes.
Mount Pinatubo	Philippines	1,745	Erupted in 1991 after lying dormant for over 600 years; killed more than 300 people.
***Mount St. Helens**	U.S.A.	2,549	In 1980, violent eruptions released large amounts of molten rock and hot ash; killed 57 people.
Mount Tambora	Indonesia	2,850	In 1815, eruption released 6 million times more energy than that of an atomic bomb; killed about 92,000 people.
Nevado del Ruiz	Colombia	5,400	Eruption in 1985 triggered mud slides and floods; destroyed city of Armero and killed about 25,000 people.
***Paricutín**	Mexico	2,808	Began in farmer's field in 1943; built cinder cone over 150 metres high in six days.
***Stromboli**	Mediterranean Sea	924	Active since ancient times; erupts constantly for months or even years.
Surtsey	North Atlantic Ocean	173	In 1963, underwater eruption began forming island of Surtsey; after last eruption of lava in 1967, island covered more than 2.5 square kilometres.
Thira (formerly Santorin)	Mediterranean Sea	564	Eruption in about 1470 B.C. may have destroyed Minoan civilization on Crete; legend of lost continent of Atlantis may be based on this eruption.
***Vesuvius**	Italy	1,277	In A.D. 79, produced history's most famous eruption, which destroyed towns of Herculaneum, Pompeii, and Stabiae.

*Has a separate article in *World Book*.

huge crater called a *caldera.* Scenic Crater Lake in Oregon, U.S.A., is a caldera that has filled with water. It is about 10 kilometres across at its widest point and 589 metres deep.

Why volcanoes occur in certain places

Most volcanoes are found along a belt, called the *Ring of Fire,* that encircles the Pacific Ocean. Volcanic activity also occurs in such places as Hawaii, Iceland, and southern Europe and at the bottom of the sea.

Scientists have developed a theory, called *plate tectonics,* that explains why most volcanoes—as well as most earthquakes and mountains—occur only in certain places. According to this theory, the earth's outer shell is divided into a number of rigid sections of rock, called *plates.* The plates slide or drift about continuously over a layer of partly melted rock. Relative movement at the boundary between two plates is generally about 1 to 10 centimetres a year. As the plates move, their boundaries collide, spread apart, or slide past one another. Most volcanoes occur at the plate boundaries. The map *Where volcanoes occur* shows the plate boundaries and the volcanic activity along them.

Most volcanoes are formed where two plates collide. One of the plates is then forced under the other. As the plate sinks, friction and the earth's heat cause part of it to melt. This melted part then rises as magma. When it reaches the surface, it produces a volcano.

Volcanic activity also occurs when two plates spread apart. Most such movement takes place on the ocean floor. As the plates move apart, magma below the crust moves up between the plates. Large amounts of lava pour onto the surface and build up the ocean floor. Magma sometimes creates an underwater mountain range, such as the huge Mid-Atlantic Ridge that runs down the length of the Atlantic Ocean. Iceland and the volcanic islands nearby are exposed parts of this ridge.

A number of volcanoes—for example, those in Hawaii—lie far from plate boundaries. Some scientists believe such volcanoes develop when a huge column of magma rises from inside the earth toward the surface. This column, called a *mantle plume,* may measure about 150 kilometres in diameter and rise 15 to 25 centimetres yearly. In some cases, the plume comes close enough to the surface so that part of the magma breaks through and forms a volcano.

For additional information on the plate tectonics theory, see the article **Plate tectonics.**

The study of volcanoes

The scientific study of volcanoes is called *volcanology.* It includes investigating the nature and causes of eruptions and has saved many lives. To aid them in their work, scientists have set up observatories on the slopes or rim of several volcanoes, including Mount Asama in Japan, Kilauea in Hawaii, and Vesuvius in Italy.

Classifying volcanic activity. Scientists classify the activity of a volcano according to how often it erupts. A volcano may thus be classed as (1) active, (2) intermittent, (3) dormant, or (4) extinct.

Active volcanoes erupt constantly. The eruption is generally quiet but occasionally becomes violent. A famous active volcano is Stromboli, which lies on an island off the coast of Italy.

The destructive force of a volcano can cause many deaths and great property damage. These homes on the Icelandic island of Heimaey were destroyed by lava during an eruption in 1973.

Intermittent volcanoes erupt at fairly regular periods. Such volcanoes include Mount Asama in Japan, Mount Etna in Sicily, and Hawaii's Hualalai.

Dormant volcanoes have become inactive, but not long enough to know whether they will erupt again. Such "sleeping" volcanoes include Lassen Peak in California, U.S.A., and Paricutín in Mexico.

Extinct volcanoes have been inactive since the beginning of recorded history. Aconcagua in Argentina and Mount Kenya in Kenya are extinct volcanoes. They probably will not erupt again.

Classifying volcanic eruptions. Scientists divide volcanic eruptions into four basic groups: (1) Hawaiian, (2) Strombolian, (3) Vulcanian, and (4) Peléean. These groups are based on the violence of the eruption and the type of material that erupts.

Hawaiian eruptions are named after the volcanoes in Hawaii and are the least violent type. In such eruptions, highly fluid lava flows quietly from several vents and gradually builds up a shield volcano.

Strombolian eruptions are named after Stromboli. Such eruptions result from the continuous escape of gas from the magma. As the gas escapes, it produces tephra that piles up into a cinder cone.

Vulcanian eruptions get their name from Vulcano, a volcanic island off the Italian coast. These eruptions occur when sticky magma plugs up the central vent. The magmatic gas gradually builds up pressure until it blasts the magma into volcanic dust and bombs.

Peléean eruptions are the most violent. Their name comes from the eruption in 1902 of Mont Pelée on Martinique, an island in the West Indies. The eruption killed about 38,000 people. A Peléean eruption occurs when the gas in highly sticky magma builds up tremendous pressure. This pressure causes violent explosions that produce glowing clouds of hot ash and dust. In a Peléean eruption, much of the volcano blows apart.

Predicting volcanic eruptions is one of the chief concerns of volcanology. When a volcano erupts, little can be done to prevent property damage in the surrounding area. But many lives can be saved if people in the area are evacuated before the eruption begins.

Most volcanic eruptions cannot be predicted. However, some volcanoes, such as those in Hawaii, have a built-in warning system. Before such a volcano erupts, it expands slightly as magma collects in the magma chamber. Then as the magma rises, many small earthquakes occur. The temperature in the surrounding area also begins to increase, and clouds of gas start to pour from the vent.

Scientists use several devices to predict when such a volcano will erupt. They use an instrument called a *tiltmeter* to measure the expansion of a volcano. A device called a *seismograph* helps detect earthquakes. Thermometers check temperature increases in the area, and gas detectors measure the amount of gas.

Benefits of volcanoes

Volcanoes are among the most destructive natural forces on the earth. Since the 1400's, they have killed almost 200,000 people. But volcanoes also produce benefits. For example, many volcanic materials have important industrial and chemical uses. Rock formed from lava is commonly used in building roads. *Pumice,* a natural glass that comes from lava, is used for grinding and polishing stones, metals, and other materials. Sulphur deposits from volcanoes are used in making chemicals. Weathered volcanic ash improves soil fertility.

In many volcanic regions, people use underground steam as a source of energy. This *geothermal* energy is used to produce electricity in such countries as Italy, Mexico, New Zealand, and the United States. In Reykjavík, Iceland, most people heat their homes with water piped from volcanic hot springs.

Finally, volcanoes serve as "windows" to the earth's interior. The materials they erupt help scientists learn about conditions within the earth.

Related articles in ***World Book*** include:

Volcanoes

See the articles on the volcanoes marked by an asterisk in the table in this article. See also the following articles:

Ararat
Chimborazo
El Misti
Hekla
Ixtacihuatl
Kilimanjaro
Mauna Kea
Mount Fuji
Mount Kenya
Mount Rainier
Mount Saint Helens
Orizaba
Pichincha
Popocatepetl

Other related articles

Cement and concrete (History)
Crater
Dust
Earthquake
El Salvador (picture)
Fumarole
Geology
Geyser
Hot springs
Igneous rock
Lake (picture: Volcanic lakes)
Lava
Mountain (Volcanic mountains)
Pumice
Rock (Igneous rock)

Outline

I. How a volcano is formed
  A. The beginning of a volcano
  B. The eruption of a volcano
II. Kinds of volcanic materials
  A. Lava
  B. Rock fragments
  C. Gas
III. Kinds of volcanoes
  A. Shield volcanoes
  B. Cinder cones
  C. Composite volcanoes
IV. Why volcanoes occur in certain places
V. The study of volcanoes
  A. Classifying volcanic activity
  B. Classifying volcanic eruptions
  C. Predicting volcanic eruptions
VI. Benefits of volcanoes

Questions

How is a caldera formed? A spatter cone?
Into what three main groups do scientists divide volcanoes?
What is *magma*? The *magma chamber*?
What three basic kinds of materials may erupt from a volcano?
How do volcanoes help scientists learn about the earth's interior?
What is the *Ring of Fire*?
How does the plate tectonics theory explain the location of most volcanoes?
How are scientists able to predict when some volcanoes are going to erupt?
How was Mauna Loa formed? Paricutín? Mount Fuji?
What is the most violent type of volcanic eruption?

Volcanology. See **Volcano** (The study of volcanoes).

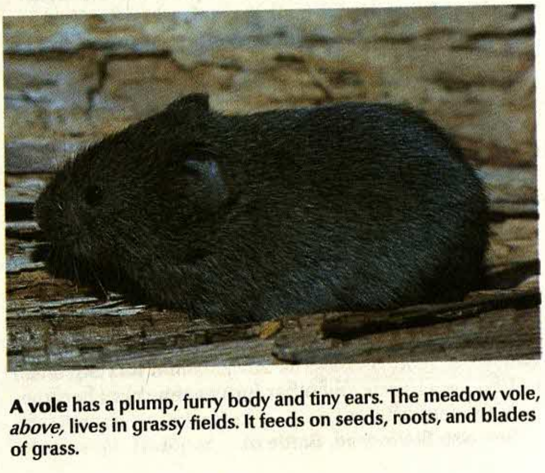
Vole is a mouselike animal. Voles have plump bodies about 13 centimetres long. They have short or medium-length tails, short legs, and tiny ears. Most have grey fur.

Voles are found across the Northern Hemisphere. These are about 100 species, many of which are named after their habitats. *Meadow voles* live in grassy fields. *Water voles* live near water. *Tundra voles* live in cold, swampy plains called *tundra.*

Voles are closely related to lemmings. The vole population changes greatly every three to seven years, as does the number of lemmings (see **Lemming**). The number of voles may increase by 20 times in this period. Then, presumably because of enemies, diseases, and lack of food, it drops sharply to its original level.

Voles have highly developed senses of smell and hearing. Young voles are born in a nest of grasses and lichens. Many nests are underground. The female vole is strongly protective of its young. The male usually takes no part in rearing the young.

Voles can damage young trees by chewing the roots and bark. Some species also carry pests such as fleas and ticks, which harbour diseases like plague and tularaemia (see **Tularaemia**).



A vole has a plump, furry body and tiny ears. The meadow vole, *above,* lives in grassy fields. It feeds on seeds, roots, and blades of grass.

Scientific classification. Voles belong to the order Rodentia, family Muridae, subfamily Microtinae. Meadow voles are genus *Microtus*.

Volga River is the longest river in Europe. It flows 3,530 kilometres through western Russia. The Volga begins in the Valdai Hills, about 320 kilometres southeast of St. Petersburg. It is 228 metres above sea level at its source. It flows southward to the Caspian Sea, where it is 28 metres below sea level. For the location of the Volga River, see Russia (terrain map). The Volga Delta is about 160 kilometres long and includes as many as 500 channels and smaller rivers.

The Volga has many tributaries. The most important tributaries are the Kama, the Oka, the Vetluga, and the Sura rivers. The Volga and its tributaries form the Volga river system. The system drains an area of about 1,350,000 square kilometres in the most heavily populated part of Russia.

The Volga is frozen for most of its length during three months of each year. Canals link it with the Baltic Sea, the White Sea, and the Black Sea via the Sea of Azov.

The fertile river valley is a great wheat-growing region. It is also rich in minerals. The valley is the centre of a large petroleum industry. Other minerals include natural gas, salt, and potash. The Volga Delta and the nearby Caspian Sea are superb fishing grounds. Astrakhan, at the delta, is the centre of the caviar industry.

Volgograd (formerly Stalingrad) and Nizhniy Novgorod (formerly Gorki) are important manufacturing cities on the banks of the Volga. Saratov, Kazan, and Samara (formerly Kuybyshev) are other important cities on the river. Nine major hydroelectric power stations and several large artificial lakes formed by dams lie along the Volga. The largest of the lakes are, from north to south, the Rybinsk, Nizhniy Novgorod, Samara, and Volgograd reservoirs.

The ancient scholar Ptolemy of Alexandria mentioned the Volga in his *Geography.* The river basin was important in the great movements of people from Asia to Europe. A powerful Bulgarian empire once flourished where the Kama River joins the Volga. Volgograd was the scene of the Battle of Stalingrad, the major victory of the Soviet Union over Germany in World War II (1939-1945). The Russian people's deep feeling for the Volga has often been told in their songs and literature.

Volgograd (pop. 969,000) is an important manufacturing city in Russia. It lies on the west bank of the Volga River, about 400 kilometres above the river's mouth (see **Russia** [political map]). Volgograd factories make aluminium, and tractors and other machinery.

Volgograd was founded in the 1200's. Its name was originally Tsaritsyn. In 1922, Russia was one of the four Soviet republics that united to form the Soviet Union. In 1925, Volgograd was renamed Stalingrad in honour of the Soviet leader Joseph Stalin. In 1961, Stalin was downgraded and dishonoured throughout the Soviet Union, and the city was renamed Volgograd. During World War II, the city was an important point in the German drive into the Soviet Union. Soviet armed forces defended the city and finally captured a large German army after a long battle. The Soviet Union was dissolved in 1991, and Russia and other former republics became independent nations.

See also **Stalingrad, Battle of.**

Volkswagen, a German car manufacturer, is one of the world's leading producers of passenger cars. Volkswagen builds about 3 million vehicles yearly and has factories in ten countries throughout the world. Audi, another German car manufacturer, and SEAT, a Spanish car manufacturer, are subsidiary companies of Volkswagen. In addition, Volkswagen manufactures car parts and industrial engines. The company also operates an electronics and office equipment firm, a bank, and an international transportation company.

The Volkswagen Beetle became the most popular car ever built. It was designed in the mid-1930's by an Austrian engineer named Ferdinand Porsche, who wanted the Beetle to be a compact, durable car that most people could afford. The German word *Volkswagen* means *the people's car.* The first Beetles were built in 1945, and from then until the mid-1960's, Volkswagen produced chiefly Beetles. The company stopped production of Beetles at its German plants in 1979. Today, Volkswagen builds and sells Beetles only in Mexico.

The German government established Volkswagen in 1937. Today, the company is owned chiefly by private citizens. Its German headquarters are in Wolfsburg.

See also **Manufacturing** (table of leading manufacturers).

Volleyball is a game in which the players hit a ball back and forth across a net with their hands or arms. It is one of the world's most popular team sports.

There are two main forms of volleyball. *Indoor volleyball* is played indoors on a court made of wood or other indoor surface material. It has six players on a team. *Outdoor volleyball,* also called *two-man volleyball* or *two-person volleyball,* is played outdoors on a sand or grass court. It may have two, three, four, or six players in a team. The two forms of volleyball have similar rules. This article discusses indoor volleyball.

William G. Morgan, a physical-education instructor in Holyoke, Massachusetts, U.S.A., invented volleyball in 1895. Today, the game is most popular in Asia and Europe. Indoor volleyball became an official sport of the Olympic Games in 1964. More than 150 nations belong to the International Volleyball Federation. This organization sponsors annual tournaments.

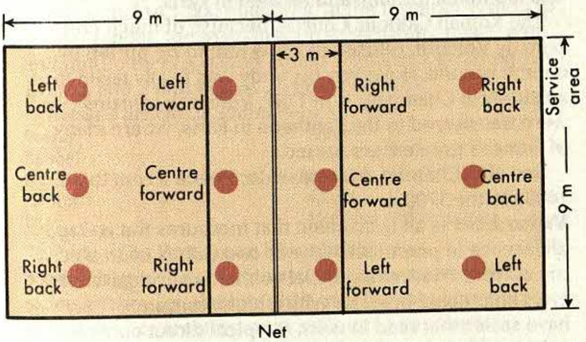
The ball is round and has a cover made of leather. It measures about 20 centimetres in diameter and weighs about 270 grams.

The court. Indoor volleyball is played on a court that measures 18 metres long and 9 metres wide. A net suspended across the centre of the court divides it in half. The top of the net is 2.43 metres high for men's games and 2.24 metres high for women's competition.

There are six positions in indoor volleyball—right back, centre back, left back, left forward, centre forward, and right forward. Until the ball has been served to start each play, players must assume a position on the court according to the order in which they serve. Two referees and two linespersons serve as officials.

The game starts with a serve by the right back of the serving team. The ball is served by hitting it with an arm or a hand. The serve must pass over the net into the receiving team's court. The receiving players must return the serve by cleanly hitting it with their hands. They cannot catch, lift, scoop, or throw the ball. A team may hit the ball no more than three times before sending it back

Volleyball games provide spirited fun and exercise for young people and adults. The players bat a ball back and forth across a high net, and often leap high to *spike* a ball, or drive it downward. Volleyball can be played on both indoor and outdoor courts and by mixed teams of men and women. The diagram, *below,* shows the positions for teams of six players.



over the net. If the ball is touched on a blocking attempt, that touch does not count as one of the team's three hits.

The players on each team try to hit the ball to the floor of the other team's court and to make it difficult for the other team to return the ball. A player may attempt to *spike* (slam) the ball past the opposing players, who try to prevent it from touching their floor. No player may touch the ball twice in a row unless the first touch was made in blocking an opponent's spike.

Only the serving team can score. It scores a point each time the ball touches the receiving team's floor or whenever that team hits the ball more than three times. The serving team also scores a point if a member of the receiving team hits the ball out of bounds or commits a foul. The right back continues to serve after each point until a serve hits the net, goes out of bounds, or is faulty in some other way. The serving team also loses the serve if it fails to return the ball. A loss of serve is called a *side out.*

After each side out, the opposing team serves the ball. But first, each of its players rotates clockwise one position. The right forward moves to the right back position, the right back becomes the centre back, and so on. The first team to score 15 points wins the game if it is ahead by at least two points. No game may exceed 17 points. If the score is tied at 16-16, the first team to score the next point wins.

Volleyball competitions are played as three- or five-game sets In deciding games, the *rally point* system is used. A point is awarded after each serve. When the serving team commits a fault, the receiving team scores a point and gains the serve.

Volt is a unit of electric measurement in the metric system known as the *International System of Units.* Its symbol is V. One volt is the *potential difference* (difference in the electrical state) between two points if 1 joule of work is done in moving a charge of 1 coulomb between the points (see **Coulomb; Joule**).

Differences in potential, often called *voltage,* are related to the energy of the electrical forces that "push" charges through a conductor. One volt of potential difference across a resistance of 1 ohm produces a current of 1 ampere. Most batteries and other sources of electromotive force are labelled according to their voltage. An instrument used to measure voltage is a *voltmeter.* The volt was named after the Italian scientist Alessandro Volta.

See also **Ampere; Electric current** (Conductors and insulators); **Ohm; Volta, Count; Voltmeter.**

Volta, Count (1745-1827), was an Italian inventor who won fame as the inventor of the *voltaic pile,* an early type of electric battery. He made several discoveries in electrostatics, meteorology, and pneumatics. The *volt,* a unit of electrical measurement, is named after him (see **Volt**). Volta was born in Como, Italy, into a noble family. His full name was Alessandro Giuseppe Antonio Anastasio Volta. See also **Battery; Electricity** (Experiments with electric charges and currents).

Voltaire (1694-1778) was the pen name of François Marie Arouet, a French author and philosopher. Voltaire's clear style, sparkling wit, keen intelligence, and strong sense of justice made him famous.

Candide (1759), Voltaire's best-known work, is a brilliant philosophical tale that has been translated into more than 100 languages. On the surface, it describes the adventures of an inexperienced young man as he wanders around the world. Philosophically, *Candide* is a complex inquiry into the nature of good and evil.

Voltaire, the son of a lawyer, was born in Paris. He received an excellent education at a Jesuit school, where many of the students belonged to the nobility. He showed little inclination to study law, and his schooling ended at the age of 16. He soon joined a group of sophisticated aristocrats who had little reverence for anything except wit, pleasure, and literary talent. Paris society sought Voltaire's company because of his cleverness, his remarkable ability to write verses, and his gift for making people laugh.

There are several theories about the origin of Voltaire's pen name, which he adopted in 1718. The most widely accepted one is that *Voltaire* comes from an imperfect arrangement of the letters making up the French equivalent of *Arouet the Younger.*

Detail of a pastel (1736) by Maurice Quentin de La Tour; Palais de Versailles, Versailles, France

Voltaire

Imprisonment and early success. In 1717, Voltaire was imprisoned in the Bastille for satirical verses that he may or may not have written ridiculing the government. During his 11 months in prison, he finished his tragedy *Oedipe.* The success of the play in 1718 made Voltaire the greatest French playwright of his time. He maintained this reputation—with more than 50 plays—for the rest of his life. While in prison, Voltaire also worked on *La Henriade,* an epic poem about King Henry IV. This poem, written in the style of the *Aeneid* by the Roman poet Virgil, was published in 1723.

Voltaire became independently wealthy in his early 30's through an inheritance and wise investments. He was also a celebrity who had three plays performed in 1725 to help celebrate the wedding of King Louis XV. Royal pensions and other honours followed. But all this success ended abruptly in 1726 when the Chevalier de Rohan, a powerful young nobleman, scornfully asked: "What is your name anyway? Monsieur de Voltaire or Monsieur Arouet?" His question implied that Voltaire was claiming to be a nobleman while he was in fact of common origin. Voltaire supposedly replied that whatever his name was, he was bringing it honour, which was more than Rohan could say for himself. This answer cost Voltaire a beating by Rohan's men. Challenged to a duel by Voltaire, Rohan had him thrown into the Bastille again. A few days later, Voltaire was allowed to choose between continued imprisonment and exile.

Exile and return to France. Voltaire chose exile. From 1726 to 1729, he lived in England, for him a land of political and religious freedom. In England he met the great writers Alexander Pope and Jonathan Swift. He also was attracted to the ideas of the philosopher John Locke and the famous scientist Sir Isaac Newton. It has been said that Voltaire went into exile a poet and came back a philosopher.

Voltaire returned to France in 1729, and published several works. The most important ones were *History of Charles XII* (1731) and his best-known play, *Zaïre* (1732). In 1733, his *Letters Concerning the English Nation* appeared in England. This book appeared in France the next year in an unauthorized edition called *Philosophical Letters.* Voltaire's praise of English customs, institutions, and style of thought was an indirect criticism of their French counterparts. French authorities condemned the book, and Voltaire fled from Paris.

Voltaire found a home with the Marquise du Châtelet, one of the most cultured and intelligent women of the day. From 1734 to 1749, he lived in her chateau at Cirey in Lorraine. During this period, he wrote several plays, an essay on metaphysics, two works on Sir Isaac Newton, and some poetry. He also wrote two notable philosophical tales. One of them, *Zadig* (1747), explores the problem of human destiny. The other, *Micromégas,* was started at Cirey and was published in 1752. In it, Voltaire used giant visitors from a distant star and from the planet Saturn to discuss the relative insignificance of human pretensions in answering religious questions. In this work, Voltaire also encouraged the use of human reason for the development of science.

Later years. Following Mme. du Châtelet's death in 1749, Voltaire accepted the invitation of Frederick the Great to settle in Berlin. After three years of living under the social and intellectual tyranny of the "Philosopher King," as Voltaire called him, Voltaire settled in Switzerland. He lived near Geneva in a chateau that he named Les Délices (The Delights). It is now the Voltaire Institute and Museum. A severe earthquake in Portugal in 1755 inspired Voltaire to write an important philosophical poem, *The Lisbon Disaster.* This work was published with his *Poem on Natural Law* in 1756.

In 1759, Voltaire purchased an estate called Ferney on the French-Swiss border. In an effort to correct the wrongs he saw in the world, Voltaire produced a constant flow of books, plays, pamphlets, and letters. Ferney soon became the intellectual capital of Europe. There Voltaire wrote *Candide,* added to his *Philosophical Dictionary,* and completed his *Universal History,* also called *Essay on the Manners and Spirit of Nations* (1759-1766). He fought religious intolerance and aided victims of religious persecution. His rallying cry at Ferney was "Écrasez l'infâme" ("Crush the evil thing"), referring to religious superstition.

Voltaire returned to Paris at the age of 83, and was enthusiastically received. There he saw his last play, *Irène* (1778), warmly applauded. But the excitement of the trip was too much for him, and he died in Paris.

The Roman Catholic Church, because of much criticism by Voltaire, refused to allow him to be buried in church ground. However, his body was finally taken to an abbey in Champagne. In 1791, Voltaire's remains were transferred to the Panthéon in Paris, where many of France's greatest are buried.

See also **Châtelet, Marquise du; Peace** (From the 1400's to the 1700's).

Voltmeter is an instrument that measures the *voltage* (difference in potential) between two points of an electric current. Most commercial voltmeters are galvanometers connected in series with a high resistance. They have scales that read in volts. A typical direct-current voltmeter has a magnet shaped like a horseshoe. To each *pole* (end) of the magnet is attached a semicircular piece of soft iron that also becomes magnetized. These pieces of soft iron direct the magnetic field toward a small iron cylinder placed between the poles of the magnet. Since soft iron becomes highly magnetized, this cylinder concentrates the magnetic field.

Surrounding the cylinder is a coil of thin copper wire wound on a light, rectangular frame. This coil is the movable coil through which the electric current flows. Each end of the wire coil is connected to a small spiral spring. As the coil moves, a needle attached to the coil also moves. This needle moves across a dial and indicates the reading in volts. Another coil of very high resistance, up to several thousand ohms, is connected in series with the movable coil.

When the voltmeter is not in use, the frame does not move and the needle reads "zero." When a current passes through the movable coil, a magnetic field is set up around the coil. As a result, the magnetic field of the horseshoe magnet acts on the current-carrying wires of the coil to produce a force on the coil. This force causes the coil to turn. The springs oppose the motion of the coil and are adjusted so that the position of the needle indicates the correct voltage. In taking voltage readings, a voltmeter is always placed across the part of the circuit to be measured.

See also **Galvanometer; Potentiometer; Volt.**

Volume of a body is the amount of space it occupies. The unit of measurement for volume is the cube, whose edges are of equal length. The volume of a box, for example, may be measured in cubic centimetres or cubic metres.

There are several ways of measuring the volume of a substance, depending upon the shape of the substance and whether it is a solid or liquid. The volume of a rectangular solid, such as a box, is found by multiplying the length by the width by the depth (or height). This could be stated in the formula, $v = lwd$ (or lwh). A cubic metre equals 1,000,000 cubic centimetres.

The volume of a cylinder is determined by multiplying the area of the base by the height, or $v=\pi r^2h$. The area of the base is obtained by multiplying π (or about 3.1416) by the square of its radius. The volume of a sphere is computed by the formula $v = \frac{4}{3}\pi r^3$ (or about 4.189 r^3).

Liquids are usually measured by special glass devices having a graduated scale. In the metric, or SI, system, liquids are measured mainly in millilitres and litres. One litre is equal to 1,000 millilitres. In the Imperial system of measurement, the main units are the gallon, quart, pint, and fluid ounce. A gallon equals 4 quarts, a quart equals 2 pints, and a pint equals 20 fluid ounces.

Related articles in ***World Book*** include:

Barrel
Bushel
Density
Gallon
Litre
Minim
Peck
Pint
Quart
Weights and measures

Volvox. See **Protozoan** (Flagellates).

Vomiting is the act of expelling the contents of the stomach through the mouth. It may indicate something as minor as overeating or as serious as approaching death. Vomiting can result from a wide variety of causes, including anxiety, bacterial infections, chemical irritation of the stomach, pregnancy, radiation, ulcers, unusual motion, or severe pain. Vomiting is usually preceded by *nausea,* an unpleasant sensation in the stomach area (see **Nausea**).

Vomiting can cause death by suffocation in people who accidentally breathe in their own *vomitus* (vomited material). This often occurs in intoxicated or unconscious people who vomit while lying on their backs. Repeated vomiting over many hours can cause death by dehydration, especially in infants (see **Dehydration**). Vomiting after a head injury may indicate damage to the brain stem, and the person should receive treatment immediately in a hospital.

When a person vomits, the stomach contents are expelled by pressure created by the abdominal muscles and the *diaphragm,* a large muscle at the bottom of the ribs. This muscular activity is called *retching.* Retching involves movement of the diaphragm downward, contraction of the abdominal muscles, and squeezing of the stomach contents upward. A person vomits when retching becomes intense enough to force the stomach contents through the *oesophagus*—the tube connecting the stomach and throat. The medical term for vomiting is *emesis.* A drug given to induce vomiting is known as an *emetic;* a drug given to cure vomiting is known as an *antiemetic.*

Wernher von Braun

Von Braun, Wernher (1912-1977), was one of the world's foremost rocket engineers and a leading authority on space travel. Von Braun directed teams that built the rockets that sent the first American into space and landed the first astronauts on the moon.

Von Braun was born in Wirsitz, Germany (now Wyrzysk, Poland). He experimented with rockets as a child. In 1932, he became an adviser in Germany's rocket programme. He played a major role in developing the V-2 rocket, with which Germany bombed Allied cities during World War II (1939-1945). In 1944, Heinrich Himmler, chief of the Nazi secret police, tried to take over the German rocket programme. He jailed von Braun, who refused to cooperate. Adolf Hitler, the Nazi dictator, freed von Braun later that year.

In 1945, von Braun led a group of German scientists who surrendered to the United States Army. Von Braun and 116 of the other scientists were sent to the United States to work on guided missile systems. In 1950, the Army assigned von Braun and his team to the Redstone Arsenal in Huntsville, Alabama, to develop the first large U.S. ballistic missile. Von Braun became a United States citizen in 1955.

Von Braun's team developed the four-stage Jupiter rocket that launched *Explorer 1,* the first United States earth satellite. Another of the group's rockets, the Redstone, launched America's first astronaut, Alan Shepard, in 1961. Other von Braun projects included the Saturn rockets. In 1969, a Saturn 5 rocket launched the astronauts who made the first landing on the moon.

In 1960, the Army transferred von Braun and his team to Huntsville's new George C. Marshall Space Flight Center, operated by the National Aeronautics and Space Administration (NASA). In 1970, NASA appointed von Braun deputy associate administrator for planning. In 1972, von Braun resigned from NASA and became an executive of Fairchild Industries, a major aerospace company. From 1975 to 1977, he was president of the National Space Institute, an organization that seeks to promote better public understanding of the U.S. space programme.

See also **Space travel** (High-altitude rockets).

Vonnegut, Kurt, Jr. (1922-   ), is an American author. Vonnegut uses many devices of science-fiction writing in his works, including space travel and fantastic inventions. Although the tone of his fiction is often playful, he is regarded as a moralizing writer with a gloomy view of humanity.

Vonnegut portrays a universe that is essentially without purpose in such novels as *Player Piano* (1952), *Cat's Cradle* (1963), and *Breakfast of Champions* (1973). In these works, all absolute systems for organizing human activity—whether political, religious, or scientific—are inevitably destructive. Vonnegut's moralizing consists of advice to be kind, to have pity, to seek the companionship of others, and to enjoy the simple human pleas-

Kurt Vonnegut, Jr.

ures. Vonnegut also expressed these views in *Palm Sunday* (1981), a collection of nonfiction pieces.

Vonnegut's experiences during World War II (1939-1945) particularly affected his attitudes. While serving in the U.S. Army, he was captured by the Germans and imprisoned in Dresden, Germany. He witnessed that city's destruction by British and American bombing in 1945. His response to that event is reflected throughout his fiction, but dealt with directly only in *Slaughterhouse-Five* (1969), generally considered his most serious work. In that novel, he confronts and accepts what he sees as humanity's tendency to inflict catastrophe on itself. He suggests that our only hope for survival lies in a despairingly comic awareness of human folly.

Vonnegut's other novels include *The Sirens of Titan* (1959), *Mother Night* (1962), *God Bless You, Mr. Rosewater* (1965), *Slapstick* (1976), *Jailbird* (1979), *Deadeye Dick* (1982), *Galápagos* (1985), *Bluebeard* (1987), and *Hocus Pocus* (1990). Several of his short stories were collected in *Welcome to the Monkey House* (1968). Vonnegut was born in Indianapolis, Indiana.

Von Neumann, John (1903-1957), was an outstanding mathematician. He wrote *The Mathematical Foundations of Quantum Mechanics* (1932). Quantum mechanics is a field of physics that describes the structure of the atom and the motion of atomic particles.

Von Neumann also founded *game theory,* a mathematical method for studying competition. This method is used to investigate complex problems in economics, political science, and sociology. Perhaps von Neumann's best-known book is *The Theory of Games and Economic Behavior* (1944), written with Oskar Morgenstern. See **Game theory.**

Von Neumann made important contributions to the design of high-speed electronic computers. Several generations of computers have been based on von Neumann's concepts. Von Neumann was born in Budapest, Hungary. In 1937, he became an American citizen.

Von Recklinghausen's disease. See **Neurofibromatosis.**

Von Sternberg, Josef (1894-1969), was an American film director. He became famous for directing films that starred the German-born actress Marlene Dietrich. These films feature the vivid, unusual settings and lighting that characterize all Von Sternberg's major films.

Von Sternberg first directed Dietrich in *The Blue Angel,* which was made in Germany in 1930. The success of this film led to six more Von Sternberg-Dietrich films, all produced in Hollywood. They were *Morocco* (1930), *Dishonored* (1931), *Shanghai Express* (1932), *Blonde Venus* (1932), *The Scarlet Empress* (1934), and *The Devil Is a Woman* (1935).

Von Sternberg, whose real name was Jonas Sternberg, was born in Vienna, Austria. His family moved to the United States when he was 7 years old. He made his debut as a director in *The Salvation Hunters* (1925). Von Sternberg directed three of the earliest gangster films—*Underworld* (1927), *The Drag Net* (1928), and *The Docks of New York* (1928). His other films included *The Last Command* (1928), *An American Tragedy* (1931), *Crime and Punishment* (1935), *The King Steps Out* (1936), and *The Shanghai Gesture* (1941).

Von Willebrand's disease is a hereditary disease in which the skin bleeds for an abnormally long period of time when injured. It is similar to the blood disorder *haemophilia* (see **Haemophilia**). However, unlike haemophilia, von Willebrand's disease causes prolonged external bleeding, and internal bleeding is rare. In addition, most haemophiliacs are males, but von Willebrand's disease affects both sexes. Von Willebrand's disease occurs worldwide, but it is most common in the Scandinavian countries. It was first described in 1926 by Erik von Willebrand, a German professor of medicine.

For clotting to occur, blood must contain various substances called *clotting factors.* Von Willebrand's disease is caused by a deficiency of one such factor, called the *von Willebrand factor.* Most patients experience mild bleeding, most commonly from the nose. But some patients bleed severely, especially after having a tooth extracted or following surgery or childbirth. Blood products containing the von Willebrand factor are given intravenously to treat the disease. A drug called desmopressin acetate also has proved effective in treating some patients.

Voodoo is a term used for a variety of beliefs, traditions, and practices that are derived largely from traditional African religions and from Christianity. The word *voodoo* comes from an African word that means *god, spirit,* or *sacred object.*

Various forms of voodoo are practised in Haiti and other Caribbean countries, and in Brazil and parts of the United States. Followers of voodoo, or *voodooists,* believe in the existence of one supreme being and of strong and weak spirits. Each person has a protector

A voodoo ceremony in Haiti, *above,* centres on a chalk diagram and includes special prayers. Voodoo was developed in Haiti by African slaves and their descendants.

spirit who rewards the individual with wealth and punishes with illness. Voodooists also believe that when people die, they go to a place called *Nan Guinin,* which means *Africa but located under the sea.*

Each voodoo temple is headed by a voodoo *ongan* (priest) or *manbo* (priestess) who performs occasional or yearly ceremonies for the benefit of a *pitit kay* (congregation). Assistants called *laplas* and *onsi* help the ongan or manbo in these ceremonies.

Voodoo developed as a series of domestic rituals among African slaves in colonial Haiti. The first slaves in Haiti did not have much contact with one another, and they practised in private the traditions they had brought with them from different parts of Africa. But as the slaves developed extended families and communities, they began to share their beliefs and practices. Many of these traditions came from other faiths, including African religions, Roman Catholicism, and Native American religions. After the Haitian revolution against French colonial rule (1791-1803), various traditions were combined, and centres of worship were established.

See also **Haiti** (People); **Magic** (Contagious magic).

Vorster, Balthazar Johannes (1915-1983), served as prime minister of South Africa from 1966 to 1978. During his term, South Africa was criticized by many countries for its policy of *apartheid,* a system of strict racial segregation that was officially established in 1948. Vorster's government enforced the policy but relaxed some apartheid laws. For example, it allowed blacks to go to some theatres and nightclubs and to participate with whites in sports. His government also declared two South African areas populated chiefly by blacks to be independent of the government (see **South Africa** [Black government]).

Vorster was born in Jamestown, South Africa, near Aliwal North. During World War II (1939-1945), he joined a political movement that favoured Nazi Germany. Vorster was elected to Parliament in 1953 as a member of the ruling National Party. He became minister of justice in 1961 and helped crush underground activities by blacks against apartheid.

Health problems caused Vorster to resign as prime minister in 1978. He was then appointed state president, a largely ceremonial office. Vorster resigned from this office in 1979. He had been accused of giving false information to a commission investigating illegal spending by government officials.

Vorticella. See **Protozoan** (Ciliates).

Vortigern. See **Hengest and Horsa; United Kingdom, History of the** (The Anglo-Saxon settlement); **Kings and queens of Britain and Ireland** (Early rulers).

Voting is a method by which groups of people make decisions. In many countries, people vote to choose their leaders and to decide public issues. People also vote to make decisions in such groups as juries, trade unions, corporations, and social clubs. This article deals with voting on public issues and in political elections.

In most countries, citizens have the right to vote in elections. But some countries with an undemocratic one-party government have deprived their citizens of any real choice in voting. The only candidates allowed to stand are ones representing the ruling party.

Citizens of democratic countries consider voting one of their most important rights because it allows them to choose who will govern them. In almost all of these countries, most candidates seek office as members of a political party. The voters may elect their public officials either directly or indirectly. In *direct elections,* the citizens themselves vote for the officials. In *indirect elections,* the voters elect representatives, who then choose the officials. The president of the United States is elected indirectly through the Electoral College (see **Electoral college**).

In democratic countries, people vote on many issues besides elections for public officials. For example, they may vote on whether to build a new school, expand the police force, or impose a tax to finance a special project. Under certain governments, voters may approve or reject proposed legislation through elections called *referendums.*

Who may vote. In the 1800's and 1900's, democratic nations have extended *suffrage* (the right to vote) to many people who previously did not have that right. Women gained the right to vote in many countries in the early 1900's. New Zealand gave women the vote in 1893 and Australia followed in 1902. However, it was 1920 before women throughout the United States could vote, and 1928 before all women over 21 could vote in the United Kingdom. Switzerland did not allow women to vote in all elections until 1971. Many countries lowered the minimum age for voting to 18 during the 1970's. However, some countries, such as Ireland and India, still maintain it at 21.

Registration is the process by which a person's name is added to the list of qualified voters. On election day, officials check each person's name against the list before they let the person vote. In some countries, a voter is required to sign a register when voting, and the signature is checked with the signature given on registration. In places where many people cannot read or write, fingerprints are used for identity. In the United Kingdom, registered voters receive a card which they take with them when they go to vote.

Restrictions on voting. All democracies limit the right to vote in special cases. In many countries, for example, people who are mentally ill or retarded or who are serving a prison sentence for committing certain crimes may not vote. Members of the House of Lords may not vote in UK general elections.

Before 1965 certain states in the U.S.A. made provisions to prevent blacks from voting in elections. There were *poll tax* laws which meant that people could not vote unless they paid a special tax. This was often applied only to blacks and poor whites. Some states also imposed a literacy test, which they used against blacks. An act was passed in 1965 to prevent these practices. In South Africa, a policy of *apartheid* denied blacks the right to vote for many years (see **Apartheid**).

Voting districts. Countries are divided into areas of approximately the same number of inhabitants for the purpose of voting. These are known as *constituencies.* A person is normally registered, and must vote, in the constituency in which he or she lives. Constituency boundaries must be changed from time to time as population numbers change. It is possible for governments to influence the outcome of elections by changing the boundaries of the voting districts, in a process called *gerrymandering.*

Methods of voting. Until the 1800's, voting in elections was usually oral and in public. Gradually, as more and more people gained the right to vote, it was thought to be fairer if they could vote secretly and anonymously. Today, most countries use a system whereby each voter marks a printed ballot paper while alone in a booth.

In some countries, voting machines are used. The voter stands in front of the machine and moves a master lever that closes a set of curtains around the voter and unlocks the machine. The names of the candidates are listed in front of the voter and the voter turns a pointer to the name or names he or she wishes to choose. The machine registers and counts the vote when the voter moves the master lever back. In some countries, voters use computerized voting machines. Instead of pulling a lever, the voter marks a square or punches a hole on a computer card.

People who are unable to vote in person because of sickness or travel away from home may be allowed to vote by post or by *proxy.* A proxy vote is where a voter authorizes someone else to vote for him or her. Normally, they must apply before the date of the election and obtain a special form on which to vote.

Counting the votes. If a voting machine or computerized system is used, the votes are counted automatically. Paper ballots must be counted by hand. Observers from all parties are present to guarantee that counting is fair. One or more *recounts* may be held if the result is close.

In many countries, including India, Malaysia, New Zealand, the Philippines, Singapore, South Africa, and the United Kingdom, elections are decided on the *first-past-the-post,* or *simple majority,* system. This means that each voter has one vote and the candidate with the most votes is the winner, even if he or she does not have an overall majority.

Some countries use *proportional representation* (PR) systems. There are several different forms of PR. In all forms, each political party gains a number of representatives in relation to its proportion of the total vote. The PR system used in Australia and in Belgium is called *preferential voting.* The Republic of Ireland uses the *single transferable vote* system.

Voting behaviour. Many people who are qualified to vote never use their rights. Turnout is normally lower in local elections and by-elections than it is in general elections. Some nations ensure high voter turnouts by fining or even imprisoning citizens who do not vote.

In general, people vote if they believe they have something to gain or lose from an election. Social scientists have found that some groups of people vote more often than others. More women vote than men, and people between the ages of 55 and 75 are more likely to vote than people of other ages. The higher an individual's income or education, the more likely the person is to vote. Family and social background also affect how people vote. For example, many people adopt the political party preferences of their parents.

Related articles in *World Book* include:

Ballot
Civil rights
Election
Gerrymander
Preferential voting
Proportional representation
Referendum
United Nations (Meetings and voting; Voting)

Vowel. When a person says "ah" for the doctor, an open sound is made with free passage of breath. This sound is a vowel, as are all the other open and freely breathed sounds in speech. In English, the vowel sounds are represented by the letters, *a, e, i, o, u,* and sometimes *w* and *y* (as in *now, city*). But each letter stands for several sounds. The open quality of vowels distinguishes them from *consonants.* Consonants are formed with the organs of speech more or less closed. A vowel may be a syllable in itself, or it may be joined with one or more consonants to produce a syllable. See also **Consonant; Pronunciation.**

V/STOL is a type of aircraft that can take off and land (1) vertically or (2) on a very short runway. The term *V/STOL* stands for *V*ertical/*S*hort *T*ake-*O*ff and *L*anding. A V/STOL plane can take off from or land on a runway that is less than 150 metres long. The largest conventional planes may need more than 1,500 metres of runway.

Some V/STOL's, called *VTOL's,* can make only vertical take-offs and landings. Helicopters also take off and land vertically, but they are not considered VTOL's. Unlike a helicopter, which has one or two rotors called *rotary wings,* a VTOL aircraft has *fixed wings* like those of a conventional aeroplane. A VTOL also can travel much faster than a helicopter. Other V/STOL's, called *STOL's,* can make only short take-offs and landings.

V/STOL's have great military value because they can land on small airfields near battlefields. They can land on small aircraft carriers and other ships without large flight decks. A V/STOL called the Harrier is used by the armed forces of Great Britain and the United States as a combat plane. It can fly faster than 1,100 kilometres per hour. STOL's also serve as commercial airliners that can operate from small airfields.

V/STOL's can be classified into five main groups, depending on their lift-propulsion system. (1) Tilt-wing aircraft have engines mounted on their wings. The wings of these planes can be tilted to change the direction of the engine thrust. (2) Tilt-engine aircraft have engines that can be moved to direct the engine thrust. (3) Variable-thrust aircraft have special nozzles attached to their engines. The nozzles can be moved to change the direction of the engine thrust. (4) Lift-and-thrust aircraft have two sets of engines. One set provides forward thrust and the other set provides lift. (5) Lift-fan aircraft have *ducted propellers* (see **Ducted propeller**). Special controls called *vanes* can be moved to change the direction of the propeller thrust.

The earliest STOL was the Autogiro, which made its first flight in 1923 (see **Autogiro**). The first modern fixed-wing VTOL was the U.S. Navy Convair XFY-1, or "Pogo Stick." This plane was test-flown in 1954. It landed by backing down onto its tail with its nose in the air (see **Aeroplane** [picture]). The first widely used V/STOL was the Harrier, which had its test flights in 1967. The British used Harriers in the 1982 conflict with Argentina in the Falkland Islands. In the 1970's, the Soviet Navy developed a V/STOL aircraft called the Yak-38 Forger for use on *Kiev*-class aircraft carriers.

See also **Aeroplane** (Special-purpose planes; picture: V/STOL's).

Vuillard, Edouard (1868-1940), was a French painter. His pictures portray his private world—a view from a window, or corners of his studio and living room enclosed by walls and furniture. In his interior scenes, he showed figures reading, relaxing, or concentrating on common tasks. He painted his environment both as a place of quiet and rest and as a disturbing situation where even the walls appear menacing. Like his friend and fellow artist Pierre Bonnard, Vuillard was influenced by Japanese art. This influence appears in the brilliantly coloured flat patterns of Vuillard's paintings. See **Bonnard, Pierre.**

Vuillard was born in Cuiseaux, near Chalon. He lived most of his life withdrawn from society.

Vulcan, in Roman mythology, was the god of fire, metalworking, and skilled craftwork in general. He also served as the blacksmith of the gods. Vulcan produced armour, weapons, and many other works. All were perfectly made, and some had magic qualities. Roman metalworkers and other craftworkers worshipped Vulcan as their patron. He closely resembled the Greek god Hephaestus. Many myths about Vulcan are identical with those about Hephaestus.

Vulcan was the son of Jupiter and Juno, the king and queen of the gods. One myth describes Vulcan as being the son of Juno alone, with no father. Vulcan was lame—the only major Roman god who was physically imperfect. Some myths say he was born lame, and others say he became lame from a fall. Although Vulcan was the least attractive of the gods, he married Venus, the goddess of love and beauty. Venus was unfaithful to Vulcan with both gods and mortal men. Many myths tell of Vulcan's jealousy over his wife's love affairs.

Because of his association with fire, Vulcan's name forms part of the word *vulcanization,* the name of an industrial process of treating rubber with heat. The English word *volcano* comes from the Italian form of Vulcan's name.

See also **Hephaestus; Venus.**

Vulcanization. See **Rubber** (Discovery of vulcanization; Vulcanization); **Tyre** (How tyres are made); **Vulcan.**

Vulgate is the name of a Latin translation of the Bible, which was largely the work of Saint Jerome. Jerome's contribution to the Vulgate was completed in A.D. 405. The Vulgate replaced earlier Latin versions and eventually became the standard Bible of the Western Church. The word *vulgate* comes from a Latin word that means *common* or *popular.*

The Council of Trent made the Vulgate the standard Roman Catholic translation in 1546. The official text consisted of a revised edition that was not issued until the 1590's. The traditional English translation of the Vulgate is called the Douay-Rheims, or Douay, Bible. It was named after Douay, France, where the Old Testament was published in 1609 and 1610; and Rheims, France, where the New Testament was published in 1582. Richard Challoner, an English bishop, revised the Douay Bible from 1749 to 1763. Challoner's edition was the standard Bible of English-speaking Catholics until about 1943. In that year, Pope Pius XII encouraged Catholic Biblical scholars to base modern translations on the original Greek and Hebrew texts. A number of English translations of the Bible are now approved for Catholic use. But only a few of these are based on the Vulgate.

The Vulgate differs from the original Hebrew and Greek texts of the Bible in the names of some of the books and in the way some of the chapters and verses have been divided. The Vulgate Old Testament, like the Greek Old Testament, also contains some books that Protestants consider to be part of the Apocrypha.

From 1969 to 1977, a commission appointed by Pope Paul VI prepared a new Latin translation of the Bible. This translation reflects modern advances in Biblical scholarship but keeps the style and much of the language of the Vulgate.

See also **Bible** (The first translations).

Vulture is the name of various large birds of prey. Vultures feed chiefly on *carrion* (dead and decaying animal flesh). Most vultures have weak feet and a bare head and neck. All have a slightly hooked beak. Their feathers generally are uniform in colour and are brownish, black, or white. Vultures live on all continents except Australia and Antarctica, usually in open country. They have keen eyesight and are excellent flyers.

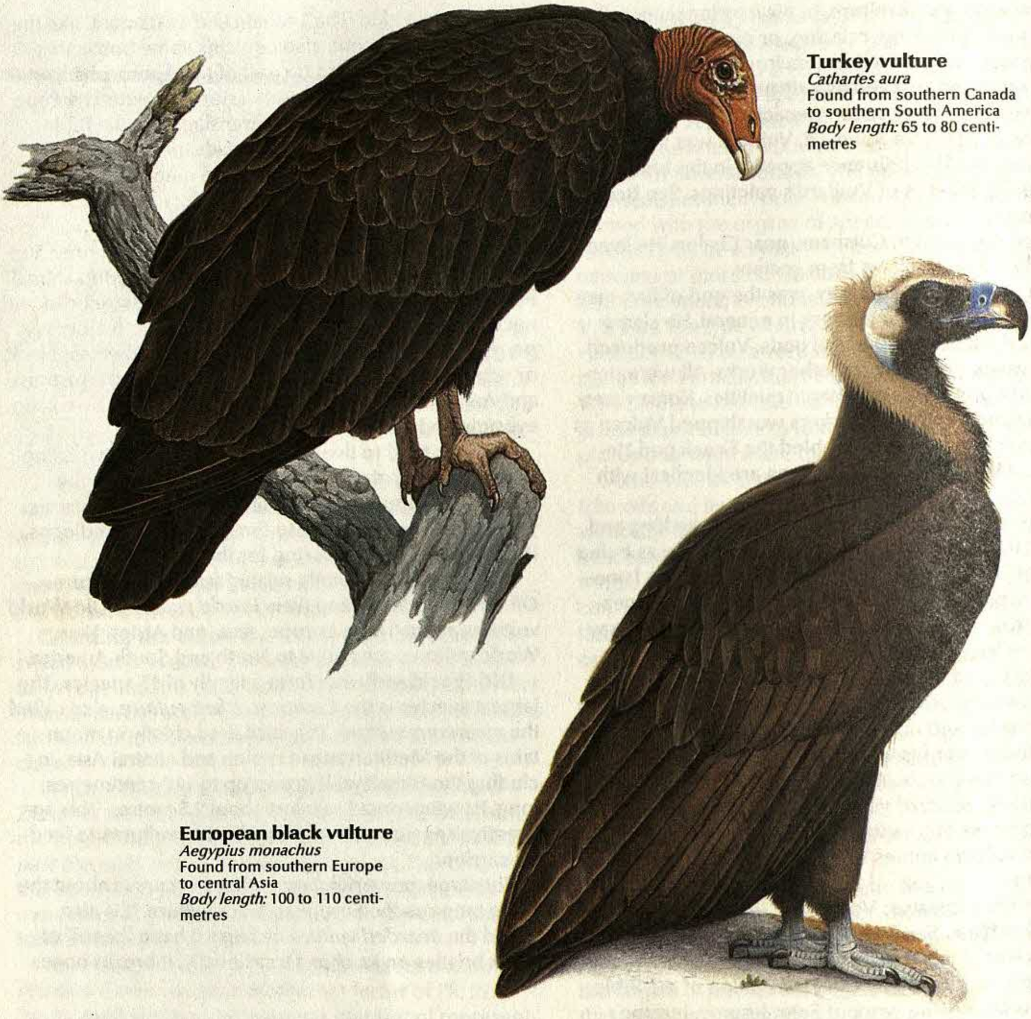
Vultures tend to live in groups. During the breeding season, males pair off with females and nest on the ground under overhanging cliffs, in logs, and in caves. The female lays from one to three light-coloured eggs. Both parents share in caring for the young.

There are two distantly related families of vultures—*Old World vultures* and *New World vultures.* Old World vultures are native to Europe, Asia, and Africa. New World vultures are native to North and South America.

Old World vultures form a family of 15 species. The largest species is the *European black vulture,* also called the *cinereous vulture.* This bird lives chiefly in mountains of the Mediterranean region and central Asia, including the Himalaya. It grows up to 110 centimetres long. Its wingspread reaches about 2.5 metres. This aggressive species often drives off other vultures to feed on carrion.

The large, powerful *lammergeier* occurs in about the same range as the European black vulture. It is also called the *bearded vulture* because it has a "beard" of black bristles on its chin. Occasionally, it breaks bones

Egyptian vultures use rocks to break open ostrich eggs. The bird hurls the rock from its beak with a snap of the neck.



Turkey vulture
Cathartes aura
Found from southern Canada to southern South America
Body length: 65 to 80 centimetres

European black vulture
Aegypius monachus
Found from southern Europe to central Asia
Body length: 100 to 110 centimetres

by dropping them on rocks from high in the air. It then eats the exposed marrow. See **Lammergeier**.

The *Egyptian vulture* is found in most of Africa, in the Mediterranean region, and east to India. It often eats ostrich eggs, which it breaks by hurling small stones at them with its beak. The *white-headed vulture* and the *palm nut vulture* live in Africa south of the Sahara. The white-headed vulture sometimes hunts small antelope, lizards, and flamingos. The palm nut vulture feeds mainly on oil from the nuts of palm trees.

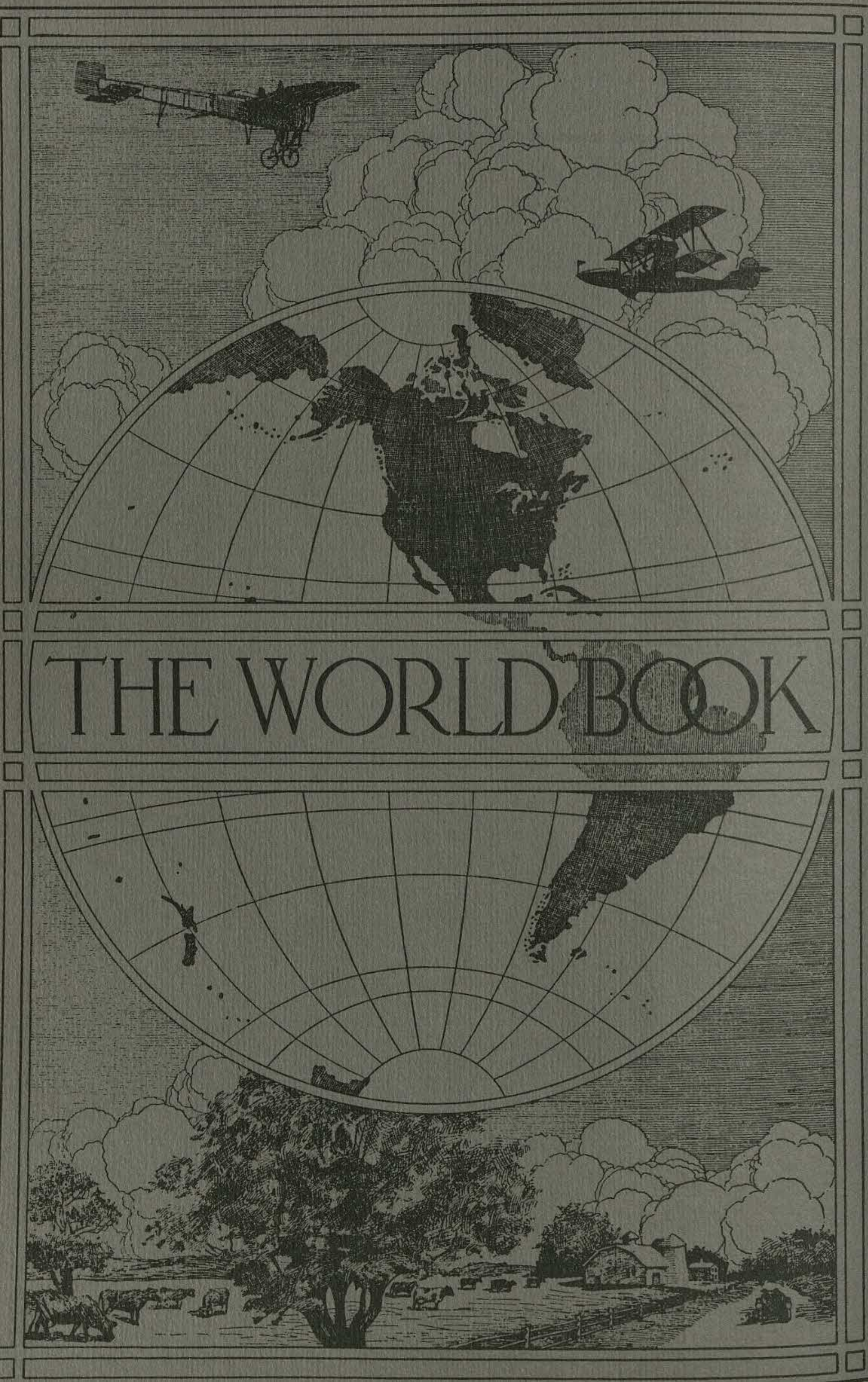
New World vultures consist of seven species, five of which are native to North America. All New World vultures have a unique *nostril hole* in their beak. When the bird is viewed from the side, a person can see through its beak by looking into the nostril hole.

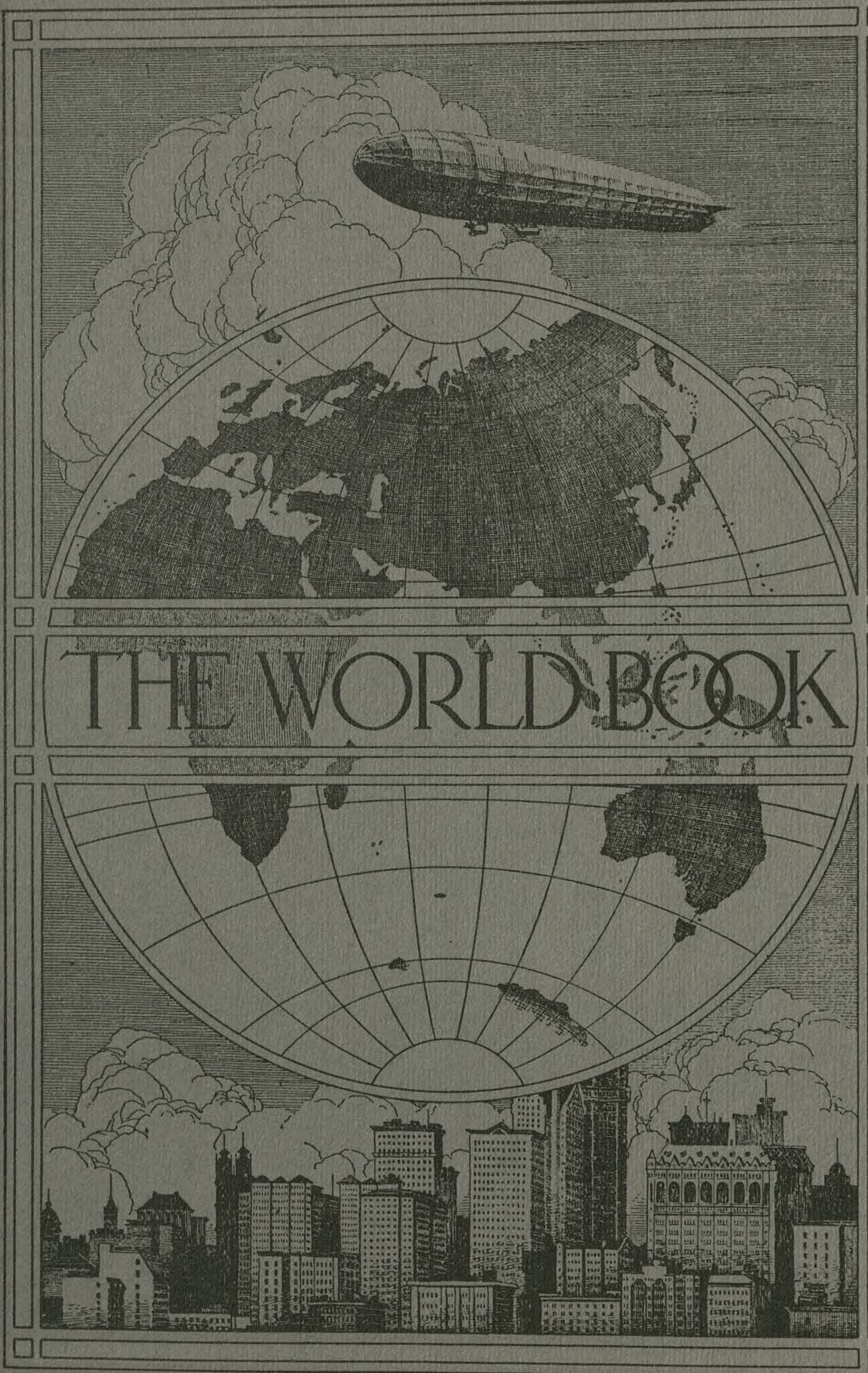
The *American black vulture* is the most common North American vulture. It ranges from the southern United States to central Chile and Argentina and measures about 60 centimetres long. The *turkey vulture* is found from southern Canada to Argentina. It has dark brown to olive-grey feathers. In some areas, black vultures, turkey vultures, and *lesser yellow-headed vultures* soar together in flocks of thousands of birds. These flocks resemble columns of smoke in the sky.

The *king vulture* is one of the most striking vultures. Its head is deeply furrowed and brilliantly coloured, with fleshy growths of rich orange. This bird ranges from southern Mexico to northern Argentina and grows to a length of about 70 centimetres.

A New World vulture called the *California condor* is one of the most endangered birds. It lived wild in California, U.S.A., until the mid-1980's but is now found only in captivity. It measures up to 140 centimetres long and has a wingspread of up to 3 metres. Its close relative, South America's *Andean condor,* has a slightly larger wingspread. It is the world's largest bird of prey. See **Condor.**

Scientific classification. Old World vultures are in the family Accipitridae. The European black vulture is *Aegypius monachus;* the lammergeier, *Gypaetus barbatus;* the Egyptian vulture, *Neophron percnopterus;* the white-headed vulture, *Aegypius occipitalis;* and the palm nut vulture, *Gypohierax angolensis.* New World vultures are in the family Cathartidae. The king vulture is *Sarcorhamphus papa;* the California condor, *Gymnogyps californianus;* and the Andean condor, *Vultur gryphus.*


THE WORLD BOOK



THE WORLD BOOK

THE WORLD BOOK